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Research is summarized and analyzed in this revision of the author's 1960 "Analysis of Research on the Education of Gifted Children," which was used as a guide in the construction and implementation of the Illinois Plan for Program Development for Gifted Children. Information is provided on identification and definition and on characteristics of gifted children. Also discussed are the highly creative child and the underachieving gifted child (attention is given to talent from culturally different groups). Consideration of intervention includes research design and stresses three areas of intervention: the administrative, instructional, and adjunctive. Needed personnel and research development programs in Illinois are treated. Additional research is cited. The bibliography contains over 200 items, dated from approximately 1925 through 1966, and the reference list annotates 32 items. (JP)

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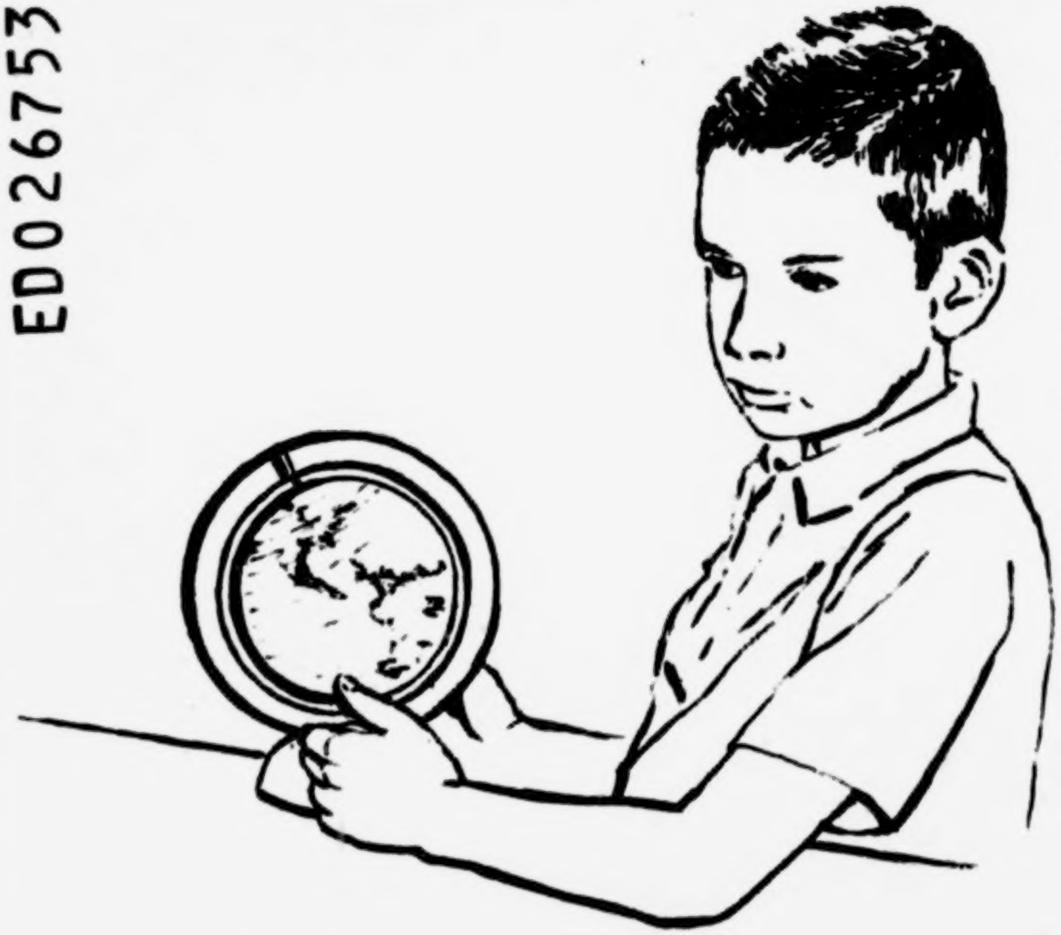

Research Summary on Gifted Child Education

James J. Gallagher

EC 001 741

Department of Program Development for Gifted Children
Office of the Superintendent of Public Instruction
Ray Page, Superintendent

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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RESEARCH SUMMARY

ON

GIFTED CHILD EDUCATION

JAMES J. GALLAGHER

Department of Program Development for
Gifted Children

STATE OF ILLINOIS
Office of the Superintendent of Public Instruction
RAY PAGE, Superintendent

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Thanks are also due to Mrs. Carol Edwards who provided patient and competent secretarial service in transforming a large set of unwieldy bits of information into a finished manuscript.

It must be realized that, in the last analysis, a reviewer of research is borrowing the accumulated brains and hard work of other persons who have actually executed the research. It is to those persons who have, through their own labors, dramatically increased our sum of knowledge in this area about gifted children that this book is respectfully dedicated.

FOREWORD

Illinois is proud of its role of leadership and the nation-wide attention given the Illinois Plan for Program Development for Gifted Children. Pride is also taken because more and more attention is being given by school districts and by teachers for better education for gifted children and because increased responsibility has been taken to be certain the education of gifted children is appropriate. Since programs for gifted children are based upon needs of children as individuals, better education results not only for children of high ability but for children of all abilities.

The Illinois Plan for Program Development for Gifted Children was developed after investigation and study by a Special Study Project for Gifted Children, established in 1959. The conclusions resulting from the Project and the recommendations of the School Problems Commission were embodied in the legislation approved by the Legislature of the State of Illinois in 1963.

Doctor J. J. Gallagher, at the request of those engaged in the Special Study Project for Gifted Children, prepared an analysis of research concerning gifted children. The recommendations concerning the Illinois Plan were based upon this study, "Analysis of Research on the Education of Gifted Children." The basic information contained in the publication were used not only for the construction of the Illinois Plan for Program Development for Gifted Children but also to provide a foundation for districts and teachers developing local programs for children of high ability. The acceptance if this book was so great, the supply was exhausted and many requests could not be filled. Doctor Gallagher has in this "Research Summary for Gifted Child Education," revised the 1960 edition and added material based upon recent research and experience. This work and its predecessor are major contributions to the development of programs for gifted children.

The Office of the Superintendent of Public Instruction is proud to continue the availability of basic information concerning the gifted children.

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CHAPTER I

INTRODUCTION

Purpose of the Report

The purpose of the present report is to review and summarize research studies and investigations which relate to the education of gifted children. Since the first review of the research was completed (Gallagher, 1960), the problems of communication have intensified with the greatly increased volume of research. One chronic problem is that one often finds potential investigators in school systems conducting research or wishing to conduct research that has already been investigated. Yet this investigator is not aware of the other work that has been done on the problem.

All the multiple resources of a major library are needed to keep up with the outpouring of new data. Too often the person in the local school system does not have these resources available to him; thus he does not know of similar research projects being conducted in other areas, or he is not aware of current trends and so he continues to make the errors of the last generation. This lack of a sense of history has always been a serious problem in the area of research. We cannot know where we are going until we know where we have been. It is the function of this publication to summarize as thoroughly as possible where we have been in the education of gifted children. In doing so, the author is confident that what has been learned on these bellwether children can be adapted and applied to the benefit of all children.

The Gifted and Their Needs in the Sixties and Seventies

The education of gifted students is not a new subject of educational discussion. Such concern can be traced in the literature for at least one-half century. A casual reading of the literature will reveal that the same complaints—low standards for gifted children, unimaginative teaching and planning, and inadequate stimulation of their mental potential—given such wide publicity today were being made in the 1920's and 1930's by educators and psychologists such as Hollingworth, Terman, and Pressey.

However, action, in terms of *significant* financial support from state and federal sources for educational improvement below the university level, is less than a decade old. This action was undoubtedly spurred by the cold war and the potential threat to our society by hostile powers. Some persons observing the national reaction to this threat predicted that this interest in the education of talented youth would be short-lived and would fade with changes in the international climate.

Programs for the talented have, however, been expanding in the country and will probably continue to do so, since the great need of an increasingly complex society is for a vast reservoir of highly intelligent and educated leaders in business and in the professions, arts and sciences. In many respects, the conservation of our intellectual resources had had an interesting parallel with conservation of the physical resources of the nation. As a great nation with almost unparalleled wealth of natural resources, the United States paid little attention initially to conservation on the grounds that so much was available that a little waste would not be terribly harmful.

The same casual approach could be noted to our educational and intellectual resources. It is a mark of a growing maturity in our society that we can now see that more systematic measures need to be adopted in order to allow for the fullest development of intellectual resources.

It has been hard to make a dramatic case for the measurable value of education of gifted children to the school economist and guardian of tax funds proud of getting $1.10 worth out of each $1.00 spent by the citizens on his schools. The immediate payoff of such personnel additions as remedial reading specialists, speech correctionists, or psychologists hired to treat emotional problems of students is fairly obvious. What is not obvious, or wholly measurable, is what has been lost through not increasing the quality of the educational program for gifted students.

In an equalitarian society it is not often popular to point out that some citizens have a much greater impact on their society than others and that many of these persons would be those called *gifted* in our schools. What we do for them or do not do for them casts a long shadow influencing many persons beside these youths themselves. The sonata never composed, the medical discovery never made, a political breakthrough not accomplished, do not impress the pennywise and pound-foolish.

How can one measure the value of an Oppenheimer or Copeland, a Lewis Terman or a John Kennedy, except to say that their value lies in their irreplaceability? No collection of less trained or less gifted individuals can do what they have done. At another level, one can ask a similar question. What is the value of a physician in a town where there is only one physician? How many other citizens could equate for that one physician?—none. If we believe our educational system makes any impact on talented students, then our failure to provide the maximum challenge and stimulation should fill us with a sense of immeasurable loss:

Of all sad words of tongue and pen the
saddest are these—it might have been.

Another force that has created continuing need for further action has been the "knowledge explosion." Many estimates have been made regarding the remarkable increase in human knowledge. Some have suggested that we are doubling the total of human knowledge every ten years. The startling increase in this expansion of knowledge can be noted through historical perspective.

Only a short quarter of a century ago, many fields and professions important to our lives now were nonexistent. Entire areas of professional inquiry and work, such as mathematical economics, atomic physics, biochemistry of genetics, servo-mechanisms, jet propulsion, were either nonexistent or but a gleam in the eyes of the more creative professionals in those fields. The implications of this "knowledge explosion" have been far reaching and still remain to be completely evaluated or understood. One implication is that the creative or imaginative child must absorb an impressive collection of information before he can bring his talents to productive function on the problems of the society or the sciences. It is hard to imagine a man with an eighth-grade education making an important contribution in atomic physics or mathematical genetics. Too much of the needed background and experience can be obtained only through the educational system.

Sir Isaac Newton once remarked,

> If I see further than others it is because
> I stand on the shoulders of giants.

How much truer this statement is today! It is one important task of the educational establishment to hoist the youngsters with talent and ability to the shoulders of past giants so that they can make the most of their superior vision.

This multitude of current forces we can observe in our society has systematically reduced our confidence in the capabilities of an educational system originally designed for a simpler agricultural society. The intellectually superior children in our society must receive an education which would enable them to adapt to rapidly changing times as well as to absorb the effective procedures of the past. In a stable culture, the valued intellectual characteristic is a good memory. The ability to know how past generations handled their problems can be a substantial guide to one's own situation. However, the valued intellectual characteristics of our rapidly changing society have to be adaptability, originality, and creativity. An education which is good only for today or represents only past wisdom obviously is unsuitable for our current society. Of course, a program that totally ignores the past would be folly also.

These are some of the conditions which face the American educator who attempts to provide appropriate education for superior children. How can this capacity be best stimulated? In what kinds of educational environments can these children be placed so that they can use their talents to the greatest efficiency so they can grow up to be warm, understanding, and effective human beings?

The research described in the present volume represents, in many instances, stumbling and somewhat awkward moves forward but it is the fact of movement that counts. The educational research of the last five years since this first volume was completed, 1960 to 1965, shows an encouraging tendency to attack problems of importance rather than problems that are easily concluded.

Department of Redundant Research

An interesting paradox exists in educational research. At a time when there are many problems of great moment to be attacked, we see old research studies being repeated, with minor variations, over and over again often with the same methodological flaws that marked the earlier efforts. This has caused the writer to initiate a continuing section in this volume entitled *Department of Redundant Research* in which he will attempt to describe these studies.

A certain amount of redundancy in research is necessary and desirable since the results of any one study might be due to particular features of sample, time, and place. Repetition of these results in different environments by different investigators lend greater confidence to the validity of the findings.

However, some studies abuse the virtue of redundancy. The educational researcher is in the position of the farmer who has planted the same crop year after year on the same land only to find that the once fertile land no longer yields a useful crop. It is the writer's purpose in this Department of Redundant Research to report some of the research designs which once produced interesting information but which now only dissipate limited resources that might profitably be spent in attacking more pressing problems.

A prime example of a research design which seems to have outlived its usefulness is the comparison of gifted and average students in social popularity or self-concept or achievement or emotional stability, etc. In most of these studies, the gifted are identified by high aptitude as measured by intelligence tests and high academic performance. When students are identified this way, they almost inevitably come from better than average family backgrounds. The results of such comparisons are a foregone conclusion. The gifted sample, identified by such methods, will be superior to the average sample on any or all dimensions. These results first obtained in the longitudinal study by Terman and his associates have been found over and over again. We need no more studies like this.

Some interesting variations of this theme, however, still remain to be done: How different will the two groups be if socioeconomic status is controlled or if siblings, one gifted and one not gifted, are compared along these dimensions? This comparison of gifted and average at least enables us to tease out the factor of socioeconomic or family background. Still to be thoroughly investigated are the general characteristics of the extremely gifted youngster—the one in 10,000 or in 100,000 whose abilities are so high that he challenges any educational program to match his development.

Why do investigators search the lighted areas again and again instead of venturing off into the potentially fertile darkness of new and uncharted problems? None of the several possible answers to this question are especially complimentary to the field of educational research. There is some question as to whether many investigators are fully aware of the fact that their colleagues have preceded them on these research designs. The lack of a sense of history in educational investigators is damaging not only in terms of unintentional redundancy but also in terms of a full and accurate interpretation of their results.

A second reason is that well-charted territories mean that instrumentation is already available for such investigation. Conversely, new problems imply that much initial emphasis must be placed by the investigator on problems of methodology and the development of tests or measuring instruments that may be beyond the time and financial resources of the individual.

Many of these problems will be reduced as we come to realize that educational research is not merely an academic exercise for doctoral candidates nor a hobby for the otherwise occupied professor, but a full-time occupation demanding the highest of skills and dedication.

CHAPTER 2

IDENTIFICATION AND DEFINITION

Since identification is a necessary first step in any program for gifted children, it is only natural that it is a subject of considerable concern and attention to educators. In the not so distant past, the identification of gifted children was considered mainly an engineering problem in which the major task was to find the proper tool or tools and apply them. The accepted definition of giftedness was a high score on an intelligence test. The intelligence test, in turn, was validated on its ability to predict success in school. ''Giftedness'' thus was reduced to a description of children who had high aptitude for school work. Those whose aptitude was not realized (who did not get high school grades, although they had high IQ scores) were labeled ''underachievers.'' But identification, in the end, must rest on the definition of giftedness and this definition has been profoundly influenced by several major forces operating in and upon society in the last decade.

Encapsulated as we are in our own space and time, it seems natural to assume that what we consider intellectual giftedness is what any society would consider talent and giftedness. It is well for us to recognize the extent to which our definition is determined by the needs of our own culture. This has been stated well by Flanagan, Dailey, *et al.* (1962).

> The definition of talent in a primitive tribe is likely to be quite simple. Where the tribe depends primarily on hunting wild game for survival, the definition of talent will focus on the ability to become an outstanding hunter. To the warring tribe, the ability to carry battle to the enemy is most prized.
>
> Even nations which produce men whose brilliant insights and ideas are still recognized today had a limited view of man's talents. The Greeks honored the orator and the artist—but failed to appreciate the inventor. Rome cherished the soldier and the administrator—but failed to recognize the many other potential talents of either its citizens or its slaves. (p. 19)

The nature of our society and the swiftly changing events of our era have stressed the value of the intellectual characteristics of adaptability, originality, and creativity. These abilities go beyond the measures of memory and simple problem-solving that are commonly found on intelligence tests.

The current emphasis on the attempts to improve the circumstances of the lower class child and of children from minority groups, has also focused attention on loss of talent that may occur in the early years of development from educationally depressing circumstances. A total school program for talented youth now has to consider not only those who are "academically talented" but also those who have "creative ability" and those who may have talent that will remain unfulfilled or even undiscovered, unless some corrective action is taken to overcome early experience and motivational deficits. Another parallel development is the change in the belief that there is one single factor of mental ability, genetically based, and the gradual acceptance of the idea that there are many different mental abilities open to environmental influence. The changes in our viewpoint of IQ tests and what they mean is summarized in Table I.

TABLE I. CHANGING VIEW OF IQ SCORES[1]

	FROM THIS	TO THIS
A.	**IQ scores represent genetic potential.**	**IQ scores are a resultant of innate characteristics and learned experience.**
B.	**IQ scores are constant.**	**IQ scores may vary with development and experience.**
C.	**Intelligence is unitary and consists of one general factor.**	**Intelligence is multidimensional and consists of many different cognitive abilities.**
D.	**IQ scores measure practically all important aspects of cognitive abilities.**	**IQ scores represent good measures of certain cognitive abilities but miss other important elements.**

This means that if we are conducting a special science program for intellectually talented persons, we might want to use a measure of general intelligence plus a test of specific scientific aptitude. If the program for talented youth is directed towards the creative artist, a different battery of identifying tools would be necessary. We are now interested in a broader spectrum of talented children and, as a consequence, in a diverse set of identification tools. Each set of identifying tools should be especially designed to fit a particular program for the talented.

Academic Aptitude

Although much of the new emphasis is on the expansion of our concept of "talented," we should not overlook the solid body of information available using traditional IQ measures. Students who score high on these tests would normally be expected to do well in an academic setting.

Three general levels of high aptitude can be identified for educational purposes. The lowest level can be referred to as the "academically talented"; it constitutes about 15-20 percent of the general school population as shown in Table II. This label is meaningful from an educational standpoint because it represents a point at which one can expect competent achievement at the undergraduate level in college if other factors do not interfere. The Stanford-Binet reference point of IQ 116 and above would delineate this particular group.

The second group can be labeled "gifted" and represents about 2-4 percent of general school population. This group possesses the educational aptitude for doing advanced graduate work or for ob-

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[1] **Taken from Gallagher, J. J. *Teaching the Gifted Child.* Boston: Allyn & Bacon, 1964, p. 6.**

TABLE II. REFERENCE POINTS FOR GROUPS UNDER DISCUSSION

Label	Total of General School Population	Estimated Proportion of School Population in Favorable Socio-Economic Community	Educational Aptitude	Statistical Reference Point	Binet IQ Reference Point
Academically Talented	15-20%	45-60%	Undergraduate work plus some graduate work	1. Standard Deviation above the mean of normal distribution	116 and over
Gifted	2-4%	6-12%	Professional degrees or advanced graduate work	2. Standard Deviations above the mean of normal distribution	132 and over
Highly Gifted	.1%	.3%	Unlimited	3. Standard Deviations above mean of normal distribution	148 and above

taining professional degrees. Using a statistical reference point, this group falls two standard deviations above the mean of the normal distribution. The Binet IQ reference point is 132 and over.

The third group can be labeled "highly gifted." They represent about .1 percent of the general population, or about one child in 1,000. In terms of educational aptitude, this individual has unlimited potential for achievement—a potential which can be stifled only by factors other than the intellectual. This group can be represented by a Binet IQ of 148 and above, or an area of three standard deviations above the average of this person's age group. The reader can note the sharp reduction in the number of persons occupying these categories the higher up we go in the intellectual scale.

Before accepting this classification, the reader should be aware of certain precautions to be taken even in using these broad terms. The theoretical percentages listed in the "general school population" in Table II are based upon national or broad regional figures and may vary markedly from school to school, depending upon socioeconomic and family background factors. A school in a superior socioeconomic area of a community could easily have three times or more the normal expectation of these gifted youngsters. Conversely, a school in an area where social and family factors are unfavorable would probably have a lower percentage of such children than the normal expectation. Each school system should do a survey of its own situation rather than base its expectations on national norms.

Effectiveness of Identification for Academic Aptitude

The optimum tool for identifying the academically talented student has been the individual intelligence test, either the Stanford-Binet or one of the Wechsler scales. However, these techniques are so expensive to administer, in terms of the use of trained personnel, that much of the educational literature has concentrated on how much would be lost through the use of some more economical alternative. The alternatives available seem to be the use of group intelligence tests, teacher nomination, or group tests of specific abilities.

A method has been presented by Pegnato and Birch (1959) for making a judgment in terms of *effectiveness* and *efficiency*. Table III gives a concrete example of the use of these indices. Let us assume that we are dealing with a total student population of 1,000. Let us assume further that we know how many students of high academic aptitude there are (this would be defined by performance on an individual intelligence test) and that this total would be 80. Let us assume further that the identification device we are evaluating is a particular teacher checklist in which the teacher is given several characteristics of the "gifted"[2] child and is asked to nominate the students who have those characteristics in their class. The "gifted" (high academic aptitude) students actually identified by such a screening device is shown in Table III to be 60 while 120 other students were identified by the screening device as gifted but

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[2] The term "gifted" as used in this section refers to those students who score high on IQ tests and who have been traditionally referred to in the literature. If the reader can substitute the term *high academic aptitude,* he will be closer to a functional definition.

TABLE III. MEASURES OF EFFECTIVENESS AND EFFICIENCY IN IDENTIFYING GIFTED STUDENTS

	N
Total student population	1000
"True" gifted students	80
Gifted identified by screening device	60
Identified by screening devices as gifted, but not really gifted	120
Effectiveness $= \frac{\text{Gifted found by screening}}{\text{True number of gifted}}$	$60/80 = 75\%$
Efficiency $= \frac{\text{Number of gifted found}}{\text{Total screened as gifted}}$	$60/180 = 33\%$

really were not "gifted." The measure of effectiveness is determined then by comparing the number of gifted students found by the screening device divided by the true number of "gifted." In this case, the effectiveness ratio would work out to be 75 percent, quite a respectable figure. Efficiency is measured by the number of "gifted" students found by the screening device divided by the total number that were identified as "gifted." A total of 180 students were identified as "gifted" while only 60 were, in reality, "gifted;" thus the efficiency rating of this particular technique would be listed as 33 percent.

Some reflection should reveal that these two indices are in a type of dynamic balance with one another. As one attempts to improve *effectiveness, efficiency* of the measuring instrument will decrease, and vice versa. If it were important to identify all 80 students with high academic aptitude present, this would mean that we would also likely choose many students who were not actually "gifted" and so the efficiency of the technique would be very limited. Indeed, 100 percent effectiveness could be obtained by labeling every child in the school as "gifted." This would guarantee that we would find all of the gifted students but would make for intolerable inefficiency (efficiency $= 80/1000 = 8\%$).

As a matter of practical administration, most schools prefer a reasonably high level of efficiency so that large numbers of children are not called "gifted" who do not belong in a special program but a high level of efficiency does necessarily reduce effectiveness by reducing the number of high academic aptitude students who would be found. The optimum level of effectiveness and efficiency that should be used by any school system is determined by the kind of program and the particular reason for identification in the first place.

Teacher Identification

Many people believe that "gifted" children are not difficult to discover. They themselves have noted some "gifted" children. It is true that many gifted children reveal themselves by their outstanding performances. Parents, neighbors, and teachers can all observe evidences of intellectual superiority. If a third grader can read books at the high school level, discuss economic theories with adults, and is building his own rocket, then standardized tests or other methods of identification merely confirm the obvious rather than identify this gifted child. Those gifted children who are hardest to identify are usually the ones who are in need of special help in the educational program.

One reason for teachers' errors in identification is the expectation that a "gifted" child should be enthusiastic in his response to the educational program. Many of these children *are* willing to go along with the program, perhaps too willing. However, some "gifted" children will resist routine and the demand of conformity and may be classified as behavior problems or merely as apathetic youngsters of average ability.

As a result of these problems in teacher identification of the "gifted," many lists have been developed to aid the teacher in his search for the intellectually superior child. One example of such a list taken from Kough and DeHaan (1955)[3] asks how a pupil stands out on the following characteristics when compared with the rest of the class:

1. Learns rapidly and easily.
2. Uses a lot of common sense and practical knowledge.
3. Reasons things out, thinks clearly, recognizes relationships, comprehends meaning.
4. Retains what he has heard or read without much rote drill.
5. Knows about many things of which other children are unaware.
6. Uses a large number of words easily and accurately.
7. Can read books that are one to two years in advance of the rest of the class.
8. Performs difficult mental tasks.
9. Asks many questions. Is interested in a wide range of things.
10. Does some academic work one to two years in advance of the class.
11. Is alert, keenly observant, responds quickly.

> Note: Some of the above statements may contain more than one identifying characteristic. If a child can be described by all or part of the statement, place his name on the *intellectual ability roster,* and the number of that statement after it.

Note the emphasis of the range of information, ability to see relationships, and effective intellectual operation.

In the past, teachers' observations have been increasingly supplemented by Group IQ and achievement tests and individual intelligence tests. The general consensus regarding the weaknesses of the teacher ratings can be summarized as follows: the teacher is likely to miss gifted children who are underachievers, motivational problems, and belligerant or apathetic toward the school program. Most authorities would agree that teachers' opinions definitely need supplementing with more objective rating methods.

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[3] *Teacher's Guidance Handbook, Part I.* Identifying Children who Need Help. By Jack Kough and Robert DeHaan. Science Research Associates, Chicago, 1955.

In the Terman longitudinal study (Terman, *et al.*, 1925), teachers in grades three through eight were given a rating scale on which they were to list the three most intelligent children in their class, the youngest child in their class, and the most intelligent child they had ever taught in that school. All of the children who were nominated by this system were given the National Intelligence Test, Scale B. The top 10 percent, with some exceptions, were given the abbreviated scale of the Stanford-Binet. Those who obtained a Stanford-Binet score of 130+ were given a complete examination.

How many gifted children might have been overlooked by this procedure? Some indication was shown in one identification study. Thirty-three teachers in grades two through six of seven schools in Santa Barbara, California, made nominations by the Terman method. All the students in all the classrooms were given National Intelligence Tests, Scale B, and those reaching the 90th percentile were all given Stanford-Binet tests. Of the total of 12 students who could be considered as qualifying for the study, three were not nominated through the teacher procedure, *a loss of about 25 percent.* Later data in San Francisco suggested that 20 percent of potentially gifted children were being missed through this system. But Los Angeles, on the other hand, reported none being missed.

More gifted youngsters were identified through the procedure of the teacher identifying the *youngest child* than by her identifying the *brightest child.* Of the group nominated as *youngest,* 51.9 percent were added to the gifted sample. Of those nominated as the *brightest* in the class, 51.5 percent were added to the study. Of those nominated as *second brightest,* 18.6 percent were added to the study. Of those nominated as *third brightest,* 4.9 percent were added to the study.

There are some indicators of the possible fallibility of these teacher ratings in identifying gifted children. Although Terman and his associates were confident that they had obtained approximately 90 percent of the total gifted population through their procedure, they do mention that a number of cases were turned up in unusual ways:

> In one case, the teacher nominating the youngest child in her room reported by accident the child whose name was adjacent to that of the youngest child on the class roll. This proved to be the only child of 300 pupils in that building who tested as high as 140 IQ.

Lewis (1945) obtained teacher nomination sheets on extremes in intellectual behavior in elementary school children from 455 schools and 310 communities in 36 states in the United States. This survey represented a total population of over 25,000 children in grades four through eight, each of whom was given the Kuhlmann-Anderson Intelligence Test and the BPC Personal Inventory. The teachers were asked to respond to the following directions:

> In the "R" column put a checkmark for any child you class as extremely mentally retarded; in the "G" column

any child you rate as a genius; in the "P" column any child you rate as a distinct problem.

These were minimal guides to the teacher and forced the teacher to make responses on the basis of her own internal value system of what "genius" or "mentally retarded" meant. While the teachers identified somewhat over 7 percent of their pupils as mentally retarded, they identified less than 1 percent of them as "genius," selecting slightly more girls than boys. In terms of IQ range, approximately 27 percent of the children labeled as "genius" had group intelligence test scores of 109 or below, and only 40 percent of them had IQ scores in the 120+ range. Since group IQ test scores are notably undependable, it may have been the test score rather than the teacher that was incorrect in some instances. Nevertheless, these results did raise serious doubt as to the teacher's ability to identify such youngsters without any more directions than were given in this situation.

Martinson and Lessinger (1960) have pointed out some of the technical problems in the identification of the intellectually gifted (high academic aptitude) pupils in the California pilot study program for gifted pupils. In identification at the kindergarten level, a screening battery was used which included teacher judgment, a teacher identification form, the Pitner-Cunningham Intelligence Test, and the Goodenough Draw-a-Man Test. On the basis of this multiple screening, 127 children out of a possible 1084 were referred, and 62 were identified as intellectually gifted (IQ 130+). This 49 percent *efficiency* ratio compares favorably with other methods. We naturally are not able to estimate *effectiveness* since we cannot know how many gifted students were actually present. The authors concluded that early identification at this early level can be accomplished with a high level of efficiency.

Pegnato and Birch (1959) attempted to screen an entire metropolitan junior high school for intellectual giftedness using teacher rating, group IQ tests, group achievement tests, honor roll placement, and artistic creativity measures. When the lists from the several screening methods were combined, it was found that 781 different names had been suggested out of a total of 1400 students enrolled in the junior high school. Each one of these 781 children was given the Stanford-Binet individual intelligence test, and an IQ of 136 or over as measured by this test was accepted in this group as the criterion of mental giftedness.

Table IV summarizes the findings of the investigators. *Teacher judgment*, often relied on in many school systems, turned out to have a frighteningly low level of effectiveness and efficiency. Fifty children of this high ability level were overlooked by the teachers while 113 students were misidentified. While it is true that these were junior high school teachers and thus could not be counted on to have the close relationship with the student that exists at the elementary level, these results are rather sobering. The other large study by Lewis also suggests a cautious approach to accepting teacher judgment as a basis for identification. It would be prudent to question teacher competency in this area until it is clearly demonstrated.

Table IV. IDENTIFICATION OF GIFTED CHILDREN IN JUNIOR HIGH SCHOOLS
(after Pegnato and Birch, 1959)

Method	Criterion	Number Identified	Correctly Identified	Mis-identified	Overlooked	Effectiveness	Efficiency
Teacher Judgment	"Mentally Gifted"	154	41	113	50	45%	27%
Group Achievement Tests	3 grades over grade placement	335	72	268	19	79%	21%
Honor Roll	B average or better	371	67	304	24	74%	18%
Creativity in Art	Teacher judgment on creative ability	66	6	60	85	7%	9%
Group Intelligence	Otis B—IQ						
	115	450	84	366	7	92%	19%
	120	240	65	175	26	71%	27%
	130	36	20	16	71	22%	56%

The mere mechanical examination of the Honor Roll revealed more gifted students than the teacher nomination although the efficiency of this method was limited. Judgments on creative art ability seemed to have little or no relationship to this level of intellectual superiority.

Pegnato and Birch concluded that by combining group intelligence scores and group achievement scores, 88 of the 91 gifted children were found. This results in an index of 97 percent effectiveness and probably represents the best possible screening device available for most school systems.

There is some indication that identification screening procedures do become less effective the younger the child is. Baldwin (1962) reported the results of screening 100 children selected from 22 different kindergarten classes in California. Twelve kindergarten teachers with two or more years of experience rated those children they believed gifted in their classes, first after six weeks of the school year, and then after seven months had passed. No definition of giftedness was presented to them. A group intelligence test, the California Test of Mental Maturity, was also administered to all children in the 22 classes.

All the kindergarten children who were nominated as gifted by their teacher or who obtained a score of 125 or above on the California Test of Mental Maturity, were given the individual Stanford-Binet. Neither teacher judgment nor the group intelligence test showed a high rate of efficiency when a criterion of a Binet IQ of 130 or above was used. The teacher's second judgment after seven months of acquaintanceship identified 38 percent gifted students while the group test had an efficiency index of 39 percent. It would seem that with young children, unless one establishes a fairly high cutoff point for the screening technique, that a number of children who would not be labeled intellectually gifted will pass through the screening procedure.

None of these studies has shown the teachers to good advantage in identifying gifted students. It is possible that if teachers had been allowed to rank their children instead of just rating gifted or nongifted their judgments might look better. Rarely is consideration given to the fact that there is considerable variance on prediction efficiency from one teacher to another. Beyond these points, the reasons for inaccurate teacher observation can be related to the difficulty of the task itself. What the teachers were being asked to do is predict a ratio score of *mental age/life age*. There is the further complication of making a judgment of superior mental development without a firm understanding of what the average student of that age group should do and very rarely have the teachers had training to aid their natural observation. However, as a result of this research and the other problems noted above, the tendency has been for school systems to rely less on teacher identification and to depend more upon group intelligence tests for screening purposes.

Group IQ Tests.

It should be recognized that any one group IQ score should not be used as a single selection standard. This is true not only because the test scores vary from one test administration to another, but also because different test scores have different meaning at different reference points.

Table V shows the maximum score obtainable by 12- and 14-year-old children on five commonly used tests of intelligence. A child who obtained an IQ score of 170 on the Stanford-Binet would find it impossible to equal that score on the Wechsler Intelligence Scale for Children. Thus, IQ variation from test to test is to be expected of bright children. This variation is often traced to the limitations of the tests and not to the fluctuating abilities of the child.

Table V also shows why a school system, using the Otis Group Intelligence Test, might have limited success in finding gifted children with IQ's over 140. If the highest obtainable score is 143 it would take a remarkable performance to score over 140 on this test. A closer examination of some of the group IQ tests used by Martinson and Lessinger (1960) revealed that on one test used at the high school level, the student had to obtain 96 percent correct answers to attain an IQ score of 125. On another test at the primary level it was impossible for a child to obtain an IQ score of 125 no matter how many items he got correct.

TABLE V. MAXIMUM OBTAINABLE IQ SCORES ON TESTS OF INTELLECTUAL ABILITY AT TWO DIFFERENT AGE LEVELS

Intelligence Tests	Maximum IQ 12 years old	 14 years old
Stanford-Binet	170*	159*
Wechsler Intelligence Scale for Children	154*	154*
Otis Quick Scoring Test of Mental Ability (Beta)	153	143
California Test of Mental Maturity (Elementary)	157	136
Lorge-Thorndike Intelligence Test (Verbal Battery)	147	150*

IQ Equivalence?

One common fault of identification procedures for the "gifted" is to assume that group IQ test scores are the equivalent of individual IQ test scores and to use an excessively high score on the group IQ test to screen gifted children. Martinson and Lessinger reported on a study involving 332 gifted pupils (IQ 130+ on the Stanford-Binet). Group IQ tests were also available on these individual tests matched. If the IQ scores of 130 had been used on the group test as a screening device, over 50 percent of the "gifted" group would have been eliminated. If a group IQ score of 125 had been used, approximately 25 percent of the known gifted group would have been eliminated. The IQ discrepancy scores in favor of the Binet (Binet obtaining higher scores) was an average of about 10 IQ points at range 130-139, 14 at the 140-149 IQ range, and a startling 34 in the 160-169 IQ range.

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* Highest score given in norm tables.

As Martinson and Lessinger pointed out, the damage of erroneously equating the group IQ results with individual IQ results extends to curriculum as well. The teacher may make curriculum adjustments on the assumptions that the 120 IQ scores on the group test are accurate measures of potential. In reality, some of these children may score well into the 160's or 180's on individual tests. Needless to say, the implications for educational planning are somewhat different for the two situations.

Justman (1956) reported the results of administering three group IQ tests to 560 students in 25 sixth grade classes in three New York City elementary schools. Among other results, he found 14 percent of these students scoring over 130 IQ on the Henmon-Nelson while only 6 percent scored over 130 IQ on the Pintner. If a strict and unthinking group IQ cutoff is maintained, serious inequities will result.

The efficiency and consistency of group IQ test scores as screening devices have been further investigated with less than enthusiastic results. Blosser (1963) tested the relative usefulness of the Otis, the Henmon-Nelson, and the Differential Aptitude Test for identifying gifted students at the ninth grade level. These group tests were administered to 294 ninth graders, and the 1960 Stanford-Binet intelligence test was given to 187 of these students. The Henmon-Nelson IQ score of 125 enjoyed the highest efficiency rating of the three tests, but all the measures fell far short of high efficiency and suggested that any type of screening device is going to identify far more youngsters than actually would qualify by individual intelligence test standards (See also Schmeding, 1964).

Specific Aptitudes

While tests of specific skills or aptitudes have become more popular as screening tools at the secondary level, they have not often been tried at preadolescent levels. However, Davis and others (1960) developed a five-part aptitude scale for gifted children, consisting of the areas of space, number, science, and vocabulary. Youngsters at Hunter College Laboratory School who scored highest in these areas were placed in an experimental program. At the end of the first grade, experimental and control groups were tested on a specially designed achievement test in each of the five areas of ability. Despite the fact that the control group exceeded the mean IQ of the experimental group by 22 points, the aptitude groups receiving special instruction exceeded the control group in achievement at this grade level.

The special sample of gifted children attending a highly selective laboratory school, plus the experimental nature of the measuring instruments, limits the significance of this study. Nevertheless, it raises the issue of whether specific ability areas can be determined in very young children.

Brandwein (1955) adopted a quite different approach to identification in a specific content area in a special science curriculum for secondary school students. He hypothesized certain factors related to academic success in the sciences. These were divided into three main groups:

Genetic

1. High-level verbal ability
2. High-level mathematical ability

Predisposing

1. Persistence
    a. Willingness to spend extra time on the subject
    b. Ability to withstand discomfort
    c. Ability to face failure and continue working
2. Questing — defined as a notable dissatisfaction with the present explanation and aspects of reality.

Activating

1. The opportunities for advanced training and contact with an inspirational teacher.

Instead of using tests as a method of identification, Brandwein introduced a program which he labeled the Operational Approach. This program included four years of science, mathematics, and language and contained the elements that could be responded to only by those students who were superior in the genetic, predisposing, and activating factors. The program was described and announced in all high school classes, and a total of 431 students applied. Three hundred fifty-four students completed the program which meant there was an 18 percent dropout for such reasons as change of interest, transfer to another school, or guidance interviews with teachers.

Brandwein compared 62 pairs of students who were matched for IQ on achievement in mathematics, science, and reading on standard tests. The *special* group took the Operational Approach Program while the *regular* group was enrolled in other curricula. The difference between the groups seemed to be in the predisposing factor of *persistence* and in *questing*, as measured by rating scales. Of those former students now engaged in research, 35 belonged to the experimental group in the Operational Approach Program and 19 were in the control sample.

This procedure, in effect, represents selection by trial rather than by test. It would be an extraordinarily expensive procedure if many students had to be dropped from the program. The volunteer nature of the program was probably selective in itself and kept poorly motivated students out.

Identification of Creative Students

While there still is much controversy regarding the utility and application of the so-called creativity tests, they have stimulated a large amount of research. The measures themselves seem closely allied to the dimension of the divergent thinking in the Guilford model (Guilford, 1956, 1959). These tests ask the student to give large numbers of answers instead of the one right answer (for example, "How many ways can you think of for improving a toy dog?") and stress the uniqueness or original character of responses to questions such as "What would happen if everyone lived to be 200 years old?"

Two questions of importance occur regarding the use of these tests:

> Do the students who score highly on these tests also score high on traditional IQ tests?
>
> Does high performance on these tests predict some useful variable in the educational scene—high ratings by teachers, performance on achievement tests or actual creative production?

If creativity test scores correlated highly with standard measures of intelligence we would be justified in assuming that the two sets of tests were actually measuring the same characteristic and would not concern ourselves with these new measuring tools. Taylor and Holland stated (1962), in summarizing the literature on this question,

> The majority of studies suggested that the relation of intelligence tests or components of intelligence tests to creativity performance is generally low (.20 to .40) in unselected populations and is zero and even negative for homogeneous samples at high levels of intelligence. (p. 93).

One study that does not support that generalization is worth reporting here. Ripple and May (1962) studied four groups made up of 30 seventh grade students each. These students were placed in four different IQ groups on the basis of their group scores and the relationship of performance on the Guilford test to the Otis IQ test was noted. When only the high IQ group was considered, the correlation between creativity and IQ scores was .39, or similar to that reported by previous investigators. However, when the correlation between these measures was computed over the full IQ range of all four groups, the correlation was .73! In short, some of the low correlations reported in other studies must apparently be attributed to the attenuation of IQ range in previous samples.

Some of the reservations about the measuring instruments themselves stem from a literature which suggests that they are much more susceptible to transitory influences than are the IQ tests. They are apparently influenced by mood changes of the child, the manner of presenting instructions, and other situational variables that might be present. For example, Dentler and Mackler (1964) studied the potential impact of examiner attitude on performance of tests of anxiety and originality. Four groups of college students were given the Torrance Tin Can Uses test and Cattell and Scheier's L Test of Paranoid Anxiety. In the experimental group the examiner presented himself as friendly and pleasant and stated with full confidence that the group would do well on the test. Three separate control groups were presented with a variety of other examiner conditions: indifference, routine classroom task, or challenge to students. Under these circumstances, the experimental group obtained a significantly higher score on originality than any of the control groups.

Talent Loss

The concept that IQ scores measure genetic potential has caused much mischief and misdirected effort on the part of educators. As long as the IQ score was regarded as a measure of the constitutional ability of the youngster, the educator's role was reduced to finding adequate means for identifying talent. It was not supposed that he could intervene in the lives of the children to produce higher levels of talent than were already being measured. With the current recognition that a certain amount of ability can be environmentally influenced, the concept of talent loss or "hidden potential" concealed by adverse circumstances has come to the fore.

The concept of talent loss includes two very different sets of circumstances. The first involves easily identified academically talented students whose ability can be recognized through tests of intelligence and achievement. These students often voluntarily drop out of the educational stream. The second type of talent loss represents a set of circumstances where intellectual potential is not easily recognized by standard intelligence tests because educational deprivation intervened and prevented the full development of the student's potential. Viewed in these circumstances, studies such as those by Plaut (1957), who pointed out that roughly 25 percent of the graduating high school population went on to college at this time, but only 1 percent of American Indians continued their further education and only 2 percent of Negroes went to interracial colleges, raise interesting questions. Other minority groups such as Puerto Ricans and Mexicans show a similar deficit in attendance in higher education.

While there is no scientific reason to assume that all racial or nationality groups are equal in intellectual potential, there *is* abundant evidence to suggest that children who come from culturally disadvantaged circumstances and receive special stimulation, do improve their performance on IQ scores. The range of ability in all nationality and racial groups is also impressive and all groups produce children with the brightest levels of intellectual ability. An improved educational environment plus increased financial opportunity to move further in the educational stream can be counted on to widen the talent pool with subsequent benefits to the society as a whole.

Cole (1956) reported on the distribution of available talent by states, based on the percentage of students in each state obtaining two standard deviations or above on the Selective Service Qualification Test given in the early 1950's. Table VI shows the list of states with the higher percentages of superior talent and the states with the lowest. It is clear to see that the states with the highest incidence of talent represent the industralized and urbanized states of the North and Northeast, whereas the states that seem to have the lowest level of talent supply are represented by the states predominantly in the Southeast where general support for education is not high and a rural agricultural society does not place great value on extended education.

TABLE VI. THE STATES WITH THE HIGHEST AND LOWEST INCIDENCE OF HIGH LEVEL TALENT (COLE, 1956)

States with Highest Incidence of Talent	*States with Lowest Incidence of Talent*
New Hampshire	Mississippi
Massachusetts	South Carolina
Connecticut	Arkansas
Minnesota	Alabama
New York	Kentucky
New Jersey	Georgia
Wisconsin	Louisiana
Michigan	Texas

Miller (1964) reported a survey in five elementary schools in Pittsburgh, Pennsylvania, in a predominantly Negro area of high economic distress. Out of a school population range of between 7,000-11,000 pupils, a total of 114 students were identified with Binet IQ's of 116+. This represented about 1.4 to 3.3 percent of the total enrollment, substantially below the national norm in which the expectation would be around 15 percent. Furthermore, of these 114 youngsters so identified, 73 percent were found at the primary grade level, while only 27 percent of them were in the intermediate grades. This would seem to suggest that the factors retarding the intellectual growth of this population were continuing to operate and to influence these results so that the limited amount of measurable talent found in the primary grades was reduced even further at the intermediate level.

Other studies by Deutsch (1964) also suggest a progressive loss of ability in children coming from culturally deprived areas as they move through the elementary grades. This, of course, represents talent going to waste.

Middle Class Talent Loss

Thistlethwaite (1958) reported on the degree of talent loss occurring in the 15,000 top scoring students in the National Merit Scholarship program. These 15,000 students were chosen from an initial sample of 167,000 and represented the finalists, semifinalists, and merit scholars who received stipend awards. Of this total group, approximately 4 percent did not go on to college. Since previous studies had provided much higher estimates of talent loss (if not going to college can be considered as such), Thistlethwaite maintained that public recognition through the National Merit program was, in part, responsible for the reduction in talent loss in these high aptitude students.

Some of the initial results of the extensive Project Talent have been reported by Flanagan and others (1964). A total of 440,000 students from 1300 schools were given comprehensive examinations in grades nine through twelve. Among the many findings reported was the information that 20 percent of the students in the top quarter of their graduating class failed to enter college, and this occurred during a time when 43 percent of the total of the 1963 high school graduates entered college within a year after their high school graduation.

Flanagan also reported on some other bits of information that have relevance for programming for gifted students. He found that in most schools 20 percent of the ninth grade students who had been tested had already attained a higher level of achievement than the average twelfth grade student. The degree to which the superior student excels his older but intellectually average schoolmates has rarely been fully understood, nor have the implications of this finding been translated into educational planning. Flanagan and his associates also found that seniors from larger schools tended to make higher scores in physical science and math than did their peers who attended smaller schools.

The potential for releasing more superior talent in our society appears to be greater than originally expected and includes both those students who have traditionally been labeled underachievers and those whose talent has been previously smothered under a bushel of environmental inequities. As yet, our methods of identification are only "adequate" and much work remains to be done before full talent development can be realized.

Summary

Identification of "gifted" children is not easy; nor can it be made by a casual, untrained observer. Too often the untrained observer turns out to be the classroom teacher who does not have an enviable record regarding recognition of gifted children. The available research suggests that if the teacher is not aided by tests, or by a more complete training in recognition of special characteristics, she tends to miss large numbers of children who are actually gifted or to identify many children as gifted who are, in actuality, not gifted.

At the present time a combination of group achievement tests and group intelligence tests seems to be the best method of insuring maximum efficiency and effectiveness, since the administration of individual intelligence tests is too costly in terms of trained manpower. Even these tests have their particular flaws and peculiarities, which in the hands of the untrained can result in serious errors in identification. The identification program in the schools should be conducted by a person who is intimately acquainted with the various strengths and weaknesses of available methods and who possesses the skills to use them to their maximum efficiency. Anything less than this will result in a weakened program.

Table VII gives a summary of the various methods that are used in identifying gifted children together with the limitations of each.

TABLE VII. SUMMARY OF METHODS OF IDENTIFYING GIFTED CHILDREN

METHOD	LIMITATIONS
Teacher observation	**May miss underachievers, culturally deprived, motivational problems, emotional problems, and children with belligerent or apathetic attitude toward the school program. Definitely needs supplementing with standardized tests of intelligence and achievement.**
Individual intelligence tests	**The best method, but expensive in use of professional time and services. Not practical as general screening tool in schools with limited psychological services.**
Group intelligence tests	**Generally good for screening. May not identify those with reading difficulties, emotional or motivational problems, or cultural impoverishment.**
Achievement test batteries	**Will not identify underachieving gifted children. In addition, same limitations as group intelligence tests.**
"Creativity" tests	**New and of uncertain validity. Show promise of identifying the divergent thinker who may be overlooked on IQ tests. May be too narrow in scope to be used without being supplemented by other measures.**

Because of these limitations, the tendency has been for schools to adopt a multidimensional type of identification in order to identify clearly the talent reservoir in the school program. Gowan and Demos (1965) suggest the following measures:

1. Select the approximate percentages of students that you wish to include in a program, presumably not less than one percent nor more than ten.
2. Use a group intelligence test and screen the top five percent and place them in a talent pool.
3. Circulate to each classroom teacher a paper for him to nominate the best student, the child who does the best critical thinking, the able child who is the biggest nuisance, the brightest minority child, etc.
4. Use an achievement battery and cut it at a point that will yield three percent of the students. Make a list of all students in the top ten in numerical skills and add these to the reservoir.
5. Have a principal, curriculum and guidance staff make a list of children who have achieved outstandingly in any skill, held leadership positions, are examples of reading difficulties but believed bright, etc.

All youngsters who have received two or more nominations should then be given an individual intelligence test. This would be a way of establishing a superior talent reservoir for the school. If the school is developing a special program in a given area then additional identification measures such as science aptitude tests or mathematics achievement tests may be needed.

Department of Redundant Research

One example of redundant research that hopefully will not be repeated is represented by the research design of asking teacher to identify gifted students in their classes and then comparing the resulting teachers' nominations with IQ scores. This kind of comparison obtains a highly predictable result—mainly that the teachers will not do well in predicting IQ scores, for reasons already stated in the preceding reviews on identification. An extension of this design which might provide useful information, however, would be to show the results of an extensive training program for teachers in which they are helped to analyze and identify superior intellectual ability in their students. The results of such a training program could be shown in the improvement in teacher identification of gifted students from a base line of students identified by these teachers before the special training program.

Another area relatively untouched is the comparison of teachers who can consistently identify highly effective gifted children with those teachers who seem to be much less efficient. Is this a factor of the teacher, of certain personality characteristics or attitudes, or what? Such variations on this theme could be usefully employed to obtain supplementary information on this general area.

CHAPTER 3

CHARACTERISTICS OF GIFTED CHILDREN

There is, naturally, an intimate connection between definition and characteristics; consequently, changes in the definition result in changes in the observed characteristics. In simpler days when a high IQ score was the sole criterion of high ability and was considered mainly a genetic property, then the characteristics of the gifted were based on how that sample appeared to compare with the average.

In line with the more complex views of human potential outlined in the previous chapter, this section will be divided into three identifiable subgroups—high IQ, high creative, and culturally disadvantaged talented. A further separate chapter on gifted underachievers follows as well.

High IQ Students—

The Terman Research

One of the most important sources of reliable information regarding the characteristics of gifted children, of the high IQ type, is the 40-year longitudinal study by Terman and his associates (1925, 1947, 1959).

Most of the investigations in child psychology, sociology, and education have been *cross-sectional,* that is a study of children at one given point in time. More useful and important information is often obtained from *longitudinal* studies in which the same individuals are studied over a long period of time. This longitudinal investigation of gifted children was undertaken by Lewis Terman and his associates in 1921. The goals of their research were to study the development of intellectually superior children from childhood into adulthood and to draw a composite picture of the characteristics of these children and chart their later achievements in life that could be related to childhood performance.

Approximately 1500 children whose Stanford-Binet IQ score was 140 and over (about the top 1 percent of the population) were studied. Many of these youngsters were studied in 1921 and re-examined in 1928, 1940, and in the middle 1950's. Thus, a large amount of information is available on these same individuals over a span of almost 40 years.

Let us consider first the adjustment these gifted children were making in school. Educational histories, teacher ratings, and achievement test scores were obtained for over 600 of these gifted children and for a comparison sample of more than 500 control children. These "control" children were selected on a basis of being those closest to the chronological age expected of that particular grade level, thus representing a sample of "typical" children.

Teacher Ratings

Table VIII shows the five subject areas in which teachers rated the gifted children to have the greatest advantage over the control children and the five subject areas in which they had the least advantage over the control children. The teachers rated the gifted children markedly superior in the area of debating, U. S. history, composition, literature and ancient history. This suggests that the gifted children do their most superior work, relatively speaking, in subjects requiring ***abstract thought***.

The areas which showed the least difference between gifted and control samples were penmanship, sports, and manual training, suggesting that the areas where the least differences existed were those in which motor ability or some special talent is a sizeable factor. Even in these areas the gifted children were still the equal of the control sample. This finding, of course, did not support the general notion that gifted children are somewhat inferior to other children in athletics or physical skills.

Among other things discovered on the basis of the Terman investigation were the following:

1. Only 1 percent of the gifted were reported by the parents as having positive dislike for school. Four percent reported only a mild attraction to school. The positive feeling for school was "very strong" for 54 percent of the boys and 70 percent of the girls.
2. Less than half as many gifted as control children displayed an undesirable attitude towards school.
3. Teachers' ratings of school work showed gifted children, as a rule, doing work of a superior quality in the grade where they were located.
4. Two and a half times as many gifted as control children were rated as very even or consistent in mental abilities, but twice as many of the gifted group were rated as very uneven, with the girls rated as less uneven than the boys.

TABLE VIII. SCHOOL SUBJECTS SHOWING GREATEST AND LEAST DIFFERENCES BETWEEN GIFTED AND CONTROL CHILDREN BY TEACHER RATING

(after Terman et. al., 1925)

SCHOOL SUBJECTS SHOWING GREATEST DIFFERENCES IN FAVOR OF GIFTED	SUBJECTS SHOWING LEAST DIFFERENCE BETWEEN GIFTED AND CONTROL
1. Debating or Speaking	25. Penmanship
2. U. S. History	26. Games and Sports
3. Composition	27. Manual Training
4. Literature	28. Painting
5. Ancient History	29. Shop Work

Achievement tests.

On the Stanford Achievement Tests administered to 565 of these gifted children, their performance was found to be consistently very superior to that of their age group. Terman and his associates developed what they called a Subject Quotient which was calculated by dividing a child's age score on a test of subject matter by his chronological age. Thus, if a child obtained an age score in reading of 10 years and his actual age was eight years, his Subject Quotient for reading was 10/8 x 100 = 125. The mean or average of all these quotients of gifted boys and girls for various subjects ranged from 135 to 148, none of them, however, exceeding the average IQ score for this group of 152. The children showed the greatest superiority in language usage with reading, spelling, and arithmetic following in that order. There is very little evidence in this study that these gifted children had any real difficulty in maintaining adequate performance for their classroom level in the type of subject matter being measured by these achievement tests.

From this result it will be seen that the problem of these gifted children does not rest in the academic area. It is rather a problem for the teacher to provide the necessary enrichment and challenge to keep up with their rapidly expanding abilities. The one reservation that might be placed on Terman's data was that the major method used in obtaining subjects (teacher ratings) was such that many youngsters with high ability who showed, however, poor motivation or inadequate cultural background might not have been identified or included in this group.

Follow-up.

What happened to these children when they grew up? Good school performance is not meaningful unless it predicts good life performance. Table IX shows some individual examples of life success in the Terman group in 1941. These vignettes are only a few of the many possible examples that could be taken. The reader should also be aware of the fact that the majority of this group were in their early or middle thirties at the time of this study and not yet at their peak of professional achievement.

Although the women in the study did not achieve the same level of performance as that of the men, this may be due to the multiple responsibilities they have had in our society. Despite the dual responsibilities as wives and homemakers, a number of them have made important contributions. Two of them were nationally known writers, and another was both the author of a successful Broadway play and a noted actress. In the science fields, there was a bacteriologist in a leading medical school and a metallurgist in a responsible research position, plus a number of physicians, missionaries, concert pianists, etc.

Another follow-up study on the same Terman group over ten years later (Terman and Oden, 1959) indicated even further achievement beyond that indicated in the 1947 publication. The investigators commented that "there are men in nearly every field" who have won

TABLE IX. SAMPLE LIFE ACHIEVEMENT OF TERMAN'S GIFTED CHILDREN

(after Terman and Oden, 1947)

JOB AREA	ACCOMPLISHMENT
Science	Physicist-Director of a great laboratory devoted to applications of atomic energy. Physiologist-Codirector on the most important investigation on the physiological and psychological effects of semi-starvation. Director of psychological research organization. Active in policy level of American Psychological Association.
Medicine	Chief of psychiatric therapy of large combat area—World War II; official psychiatrist at trial of Nazi war criminals. Widely known plastic surgeon. Director of public health department in leading medical school.
Government	State Department Chief of one of the critical areas in the Western Hemisphere. One of the youngest brigadier generals in the Army.
Arts	Noted motion picture director. Two fiction writers of national reputation. Noted lawyer who has mastered 15 languages as a hobby.

national prominence and 8 or 10 who have achieved international reputation. Among the tangible indications of achievement we find 70 of the men in the study listed in *American Men of Science* and 31 of the men listed in *Who's Who in America.*

Another tangible indication of intellectual productivity is the amount and quality of the writing done by this group. They have compiled a total of 2,000 scientific and technical papers and articles and over 60 books and monographs in scientific fields. Two hundred and thirty patents have been awarded to the group, and there have been published 33 novels, 375 short stories and plays, and innumerable radio, television and movie scripts. This study has put an end in professional circles to the myths about gifted (high IQ) children not achieving in adulthood.

Genetic influence

The great emphasis currently placed on the important role played by environment in the development of intellectual ability should not lead the reader to assume that heredity is no longer considered to have an important role in the development of those abilities. Nichols (1965) used as a basic sample 596,241 juniors who took the National Merit Scholarship Qualifying Tests. From this large sample, 1507 sets of twins were identified. These were divided into monozygotic and dizygotic twins on the basis of a questionnaire on physical similarity plus blood samples. Those sets of twins who could not be clearly classified by the index were omitted from the study.

The performances of these two groups were then compared on the National Merit Scholarship Tests consisting of five subtests: English, Mathematics, Social Studies, Natural Science and Word Usage. A composite score was obtained on the performance of these five tests. In all measures, for both male and female, the correlation between monozygotic twins was higher than dizygotic and this difference reached a statistical significance in all but one test—English Usage score for the males.

In order to account for a possible bias of the twins having differential experiences, the author determined by questionnaire which sets of twins had experienced periods of separation or specific illnesses. All sets of twins who reported such phenomena were then removed from the sample, and comparisons were made again. The correlations for both monozygotic and dizygotic twins increased with the elimination of these sets of twins, but the relative position remained the same, with the monozygotic twins always showing higher correlations.

Nichols feels that the correlations obtained are consistent with Burt's estimate (1958) that 77 percent of the observed variance in intelligence is attributable to heredity.

Physical Abilities

Since Terman's longitudinal studies, it has been generally accepted that gifted students will show superiority to the average child in almost any measurable dimension, whether physical development or social or emotional adjustment. But is this superiority due to superior intellect or to the generally superior environment these gifted (high IQ) samples are drawn from?

Laycock and Caylor (1964) compared a sample of 81 gifted intermediate grade students (Binet IQ 120+ or CTMM 130+) with a less gifted sibling (at least 20 IQ points below gifted sibling) on a broad spectrum of physical and anthropometric measures. They found no differences on any of the physical measures between these matched pairs and concluded that when environmental differences are controlled, the gifted child does not reveal superiority in the physical dimension. The value of this study was somewhat diminished by an unaccountable failure to control for sex of sibling. There was also some overlap in IQ in the two groups because of the particular method of choosing the ''non-gifted'' siblings. Some of the ''less gifted'' (20 points below sibling) had IQ scores above some of the ''gifted.'' Nevertheless, this study intimates that when various non-intellectual factors are controlled, the differences between gifted and average samples are not as impressive as previously held.

Learning Ability

The very nature of their intellectual status makes it inevitable that gifted (high IQ) students learn more effectively than average students. The question raised in this section is whether their learning skills show a particular pattern or the use of specific strategies which would give some clues as to how they may enhance their superior status.

Klausmeier and his associates have done a series of studies comparing the learning characteristics of 40 gifted fifth grade boys and girls (WISC IQ 120+) with similar groups of average (WISC IQ 90-110) and slow students (WISC IQ 56-81) of the same life age. The slow group excluded glandular and neurological cases.

In one comparison, Feldhusen and Klausmeier (1962) found a negative relationship between IQ and scores on the children's manifest anxiety scale in both boys and girls; that is, the higher the IQ, the lower was the anxiety. The authors felt that superior mental ability may make it possible for a child to assess his environment and deal with it more effectively. The reader should remember that there were no controls for possible environmental factors that might influence these results. A substantial income, for instance, may dampen anxiety feelings also and would more likely be found in the gifted than the slow families.

The behavior of the same groups of children was studied during the process of solving arithmetic problems. A series of 29 problems, requesting the number of coins and bills needed to reach a particular sum, was selected by the experimenters (Klausmeier and Loughlin, 1961) and graded for difficulty. Each child received only one problem at their pretest level of performance. The time spent in solving the problems was not significantly different for any of the groups.

The gifted, average, and slow groups were compared on the degree to which they manipulated the figures and coins, withdrew from the situation, offered incorrect solutions, verified their results and showed a logical approach. The gifted group performed significantly better than the average group in persistence, in not offering incorrect solutions, in verifying their results and using a more logical approach. Thus, high ability students showed a performance style that was likely to enhance these already large differences between them and average or slow students.

However, a third study (Klausmeier and Check, 1962) in which retention and transfer was studied found little differences between the ability groups. Each of the youngsters was given an arithmetic problem at his level of difficulty. Solutions to the problems were reached in 15 minutes, with cues or helps being given by the examiner as needed at regular intervals. After the solution was reached, five minutes of recorded stories and songs were introduced; then the original problem was presented to 60 of the subjects (retention). A transfer problem, based on the same principle, was given to the other 60. Seven weeks later, the original problem was given to the same retention group and a new transfer problem of the same level of difficulty was given to the transfer group. On these tasks, no differences between ability groups were obtained on either the retention or transfer tasks, although the retention group did significantly better than the transfer. The authors believed the lack of differences lay in the correct selection of level of difficulty for the problem.

Carrier, Malpass, and Borton (1961) compared the learning performance of 118 children from 11 to 14 years of age who were divided into three IQ categories—Bright (WISC IQ 120-150), Normal (WISC IQ 90-110), and Educable Mentally Handicapped (WISC IQ 50-80). These subjects were matched on age and sex and grouped into triads for assignment of tasks. A series of tasks that ranged from the conceptual to the manipulative were presented to the subjects in an air-conditioned mobile laboratory which also allowed for the collection of other data not usually collected in such experiments. Four measures of emotional tension: electrical skin resistance, vasodilation, respiration, and gross body movements were tallied.

The investigators expected to find a negative relation between intelligence and emotional tension. In other words, the more intelligence the less anxiety would be produced. They did find the cognitive tasks more tension arousing than the manipulative tasks but the relationships between emotional tension and learning performance were low.

In other words, the crucial variable in this situation was not that the student becomes anxious in a learning situation, but what he did about such anxiety. Some students will grasp the nettle, or the difficult problem, and through solution of the problem will reduce their anxiety. Other students will attempt to reduce their anxiety by avoiding or withdrawing from the problem. These different reactions to the same internal stimuli have vastly different implications for learning. These authors also commented on the need for a variety of measures for such characteristics of learning, emotion and motivation, since the relationship between measures attempting to get at these broad classes of concepts were not too high.

The learning ability of 13 gifted, 24 average and 36 retarded junior high students from a metropolitan area was tested by Jensen (1963). The groups were matched on CA but different in ethnic origin and sex distribution, and had mean IQ's of 142, 103, and 66 respectively. The subjects were presented a series of colored geometric forms on a screen and asked to predict which would be the next form that would appear. They were given the reinforcement of a colored light when correct. Significant differences were obtained among all three groups with the gifted being most superior.

The ability to predict such answers rests in the mental capacity to hold a hypothesis regarding the system or pattern that is being followed by the experimenter while examining stimuli. This may be one type of specific description of what is functionally meant by superior intelligence.

Another approach to the problem is to look for qualitative patterns that result from performance on standard psychometric instruments. Gallagher and Lucito (1960) have pointed out that when the *relative* intellectual strengths and weaknesses of gifted, average, and mentally retarded children are compared on tests of intelligence, there are sizable differences in patterns of intellect among the three groups. They found that the gifted children had their strongest area of success on tasks relating to a factor of *Verbal Comprehension* which encompasses meaningful manipulation of verbal symbols. The mentally retarded groups were relatively strongest, on a factor of *Perceptual Organization* composed of nonverbal tasks. The average group did not show a characteristic pattern related to known factors of the tests.

A similar finding was obtained by Thompson and Finley (1962). Comparing the WISC profiles of 400 gifted and 309 mentally retarded children (CA 10), they found the gifted highest in tests of verbal comprehension while the retarded were relatively strongest in tests of perceptual organization. These results would emphasize a difference in mental development in a qualitative as well as quantitative sense.

Much of the available literature on learning skills is based upon simple rather than complex problem-solving ability. One of the most puzzling aspects of the intellectual development of gifted students is *how* they think and solve problems. Many times, the observer or teacher can only see the problem and the apt solution. What goes on in the mind of the student between these two points is often a dark, though impressive mystery.

Koeppe and Rothney (1963) compared the oral problem-solving performance of 200 gifted students (top 5 percent of their class) divided by sex and by grades nine through twelve. Each student's task was to solve twelve problems. After the student gave the answer to the problem, he told the examiner how he arrived at the solution. All answers were tape recorded. The problems were designed so as to require no specific field of knowledge and there was only one correct answer to each problem.

On only four of the twelve problems were there sex differences noted: two problems on which boys were superior and two on which the girls excelled. The nature of the items themselves suggested that variations in interest were more responsible for the differences than basic problem solving abilities. No substantial differences were found by grade level either!

The analysis of the problem-solving process used by the students revealed that no single style or method was systematically applied. Instead, the students used different approaches to reach the answers in the various problems. But students who verbalized in "if-then" relationships gave more correct answers than those who did not. Although no significant differences were found between the sexes, the boys were more certain of the correctness of their answers than the girls.

Boehm (1962) compared four groups of students through the use of story telling methods on the development of conscience or moral values. The samples were divided according to upper and working class, sex and intellectual level (gifted vs. average). For each student in the sample, ages six to nine, four stories were presented in a projective-type environment, and students were asked how the story should come out. The results of the experiment were as generally expected. The academically gifted children showed earlier maturation and moral judgment particularly concerning a distinction between the intention and outcome of an action than did children of average intelligence. The upper-middle class students appeared superior on this dimension to the working-class children. Greater differences were found between the gifted and average students of the upper-middle class level than of the gifted and average ability students in the working class. To some extent the degree of morality shown depended on the situation.

Each of the stories were scored independently on tape recordings by three judges and classified according to Piaget's three levels of morality, cooperation, intermediary and constraint. The work of Piaget has been recently receiving deserved recognition in American psychology and education. One of the frequent criticisms of Piaget's discussion of stages of development has been his unwillingness to consider individual differences among youngsters and, instead, to make statements about what the seven-year-old or nine-year-old could do without particular consideration as to either the ability level or home background of the particular student. On the basis of this study, it would appear that these criticisms were valid and future discussions of developmental ages of moral development must take into account both ability level and social class.

Achievement

Little has been added to the literature on the achievement of high IQ children since the Terman work. For the most part, they are redundant and confirm the Terman position that high ability children will do well in later schooling and in life performance.

For example, Gallagher and Crowder (1957) gave the Stanford Achievement test to a group of 38 highly gifted students (Binet IQ 150+) in a midwestern university city. In the *Paragraph Meaning* test the median (middle) score of the group was almost four grades above their chronological level while the *Word Meaning* median scores were about three-and-a-half grades in advance of their grade level. Clearly, it would require a very high-level curriculum program to challenge these fourth and fifth graders who have already surpassed average freshmen and sophomores in high school in their use and comprehension of language.

The case for arithmetic superiority was not quite so clear. In the *Arithmetic Reasoning* test, the median score was about two grade levels advanced and in *Arithmetic Computation* less than one grade level advanced. The difference between the reasoning and computation scores can probably be explained by the fact that the superior reading ability of these children could help them on the *Arithmetic Reasoning* subtest.

Their relatively low computation score can probably be accounted for by the fact that the test itself is developed on a vertical basis with a few problems in addition, another few in subtraction, and so on, to briefly cover each of the major arithmetic operations. Since these children were given, at the most, horizontal enrichment in arithmetic, they would not be expected to perform on those processes not covered at their grade level. Even the most gifted child would be hard pressed to learn how to do long division unless someone spent a little time explaining it to him.

This group's performance in social studies and science rather closely parallels their performance in the reading areas, as might be expected. All of these results should not be interpreted as meaning that there were no problems related to school work. The standard achievement tests, in most instances, usually test for knowledge of facts rather than the ability to apply those facts. Both teacher ratings and personality tests on the above group suggested that many of them were mediocre in their ability to do creative work. This fact should be received with some soberness since this group, above all others, should excel in this area.

Similar findings of superior academic performance have been reported for other groups of gifted children by Witty (1930), Hollingworth (1926), Miller (1957), Klemm (1953), and many others.

Emotional Adjustment

While fairly adequate measure of achievement and intellectual status have been available on gifted children in the United States from the early 1920's, the same cannot be said concerning the measurement of motivational and personality characteristics. Although the early studies made valiant attempts to identify these characteristics, they were hindered by lack of adequate measuring instruments and the limited theoretical development of the field.

For example, some of the earlier Terman studies (1925) attempted to use measures of character development including tests which measured the tendency of students to falsify certain information. The children were asked to place a check on a list of books they had read. Some of the books on the list were fictitious, and the number of these books checked was a measure of falsification. However, these character traits seemed to be fairly specific to the task itself. Some children could be identified as fairly responsible regarding school assignments and very irresponsible concerning care of their younger brother or sister. Other children who would not dream of taking money, even if the theft could not be observed, might very well cheat on an exam where the danger of failure was so great as to put them under strong pressure.

Some indication of emotional adjustment was provided by the findings of the Terman and Oden (1947) follow-up study on their gifted children when they were young adults. As a group, they had a slightly lower rate of suicide and insanity and a better marital adjustment than expected of the general population. This finding was contradictory to some earlier views on genius.

Genius and Insanity

For many years there has been a school of thought which has equated genius and insanity. Such a view, descending in large part from the works of Lombroso, *The Man of Genius*, has many supporters. A statement by Tsanoff (1949) is typical. "A home which nurses a genius may very likely also harbor a future criminal or a downright lunatic." (He concludes, however, that the relationship here is not a causal one.) The biographies of men of great talent such as Poe, Van Gogh, Beethoven, Napoleon, Oscar Wilde, etc., add substance to this point of view. What we would like to know is whether emotional instability must always accompany great work, whether great ability leads one to insanity, or whether the instability that has been coupled with high ability in individual cases is present through coincidence.

The danger of taking case histories as evidence is that it is easy to be selective and pick only those cases which illustrate your point of view and overlook such individuals as Verdi, Churchill, Shakespeare, etc. Also, if we judge persons of past ages on modern standards, we may conclude that every citizen of past eras was either immoral or insane. A more convincing argument for this point of view can be made if it could be demonstrated that there is a high degree of relationship between emotional difficulties and high intelligence in children today. There is considerable evidence available on this point.

General Emotional Stability—Elementary Level

A series of research studies comparing gifted and other groups are available. Lightfoot (1951) compared, by means of tests and rating scales, 48 gifted elementary school children with 56 mentally retarded children in that same school. Comparison revealed the gifted to be slightly above average in adjustment while the retarded were below average. Characteristics particularly related to intellectual giftedness were creativity, dominance, affiliation, protectiveness, and achievement. Those characteristics particularly related to the mentally retarded were dependence, seclusion, rejection, and defensive behavior.

Gallagher and Crowder (1957) gave the Rorschach ink blot test to 35 highly gifted elementary school children (Binet IQ 150+), and found little or no evidence of serious emotional problems in all but two of the children. These results were confirmed by teacher ratings. The only characteristic in which the children showed less than "superior" was the area of creativity. In this respect, too, the Rorschach test and the teacher ratings showed agreement.

Mensch (1950) in a review of Rorschach studies used with gifted children found that they had a higher number of responses, a higher level of form quality, and qualitatively better records. This would suggest an overall better adjustment for this group. Gair (1944) found that seven-year-old gifted children showed better organization, wider range of interest, and much more adjustment than children of average or below average IQ. Hildreth (1938) found that in comparing a group of gifted children with a group of intellectually average children matched with the gifted on age, racial background, and socioeconomic background, the teachers had five times as many favorable ratings for the gifted as for the average.

Emotional Stability—Secondary Level

The same general picture is revealed in studies of secondary level students. Ramaseshan (1957) compared a group of over 200 gifted (Binet IQ 120+) senior high school students in three Nebraska high schools with a group of average students on measures of personality and social adjustment. The two groups were rated by their teachers on personality, responsibility, adjustment, initiative, and work habits, and the students were administered the Washburne Social Adjustment Inventory. On the teachers' ratings, the gifted group was significantly superior to the average on all variables and without regard to sex. On the Washburne scale the gifted were superior at a statistically significant level on all the variables with the exception of sympathy. On factors such as truthfulness, happiness, purposiveness, judgment, etc., the gifted group showed a clear superiority. The test results confirmed the teachers' ratings, although the differences between the groups were less on the tests than on the ratings.

Wrenn, Ferguson, and Kennedy (1936) compared the top 5 percent on the ACE psychological examination with the lower 15 percent of a total student body of 9,990 junior college students. These groups were administered the Bernreuter Personality Inventory and comparisons were made between these two groups. The authors found no differences on the characteristic of emotional stability, but did find the highly intelligent junior college students were more self-sufficient and dominant than the junior college students of lower levels of ability or of the average of the college population.

Strang (1956) compared the viewpoints of gifted adolescents concerning the problems of growing up with those of their classmates. There were large areas of similarity in both groups. Both had typical attitudes of dissatisfaction with one's body and social status and were concerned with problems of their relationships with siblings and parents. Those characteristics which did seem to show differences from average children were that the gifted relied less on peer acceptance and were less concerned with boy-girl relationships and with lack of rapport with parents.

The advent of the National Merit Scholarship program provided the basis for more information on superior secondary school students. Warren and Heist (1960) compared 659 men and 259 women who were National Merit Scholarship winners or semifinalists with an unselected sample of undergraduate students on personality characteristics. There was no great incidence of serious maladjustment as found on the MMPI test, but there were considerable differences in favor of the Merit Scholars on variables of originality, imagination, inventiveness, and resourcefulness.

Nichols and Davis (1964) in a similar study compared 1184 National Merit scholarship semifinalists, who were college seniors at the time that they were studied, with a large sample representing the average college graduate. Again the differences found were in the attitudinal dimension. The investigators discovered the Merit Scholars to be less religious and conventional, more committed to political allegiance, and more concerned for freedom from supervision (a point which should not be lost on educators). Descriptive adjectives which they accepted as part of their self-concept included the following: intellectual, dominant, forceful, idealistic, rebellious, moody, lazy, witty, and cultured. They identified themselves as less interested in the social and athletic dimension.

Kennedy (1962) compared the MMPI Profile of a sample of 100 gifted adolescents in a National Science Foundation Summer Institute for mathematics. These students had a mean chronological age of 17 and a mean Wechsler IQ of 135. The general profile on this personality test was well within normal limits and supported many other studies which suggested that high achieving, high IQ students do not have substantial personality adjustment difficulties. The difference between them and their less talented age mates apparently centers on attitudes and dimensions of cognitive style rather than dimensions of emotional maladjustment.

Lessinger and Martinson (1961) compared a group of gifted eighth graders on the California Psychological Inventory with gifted high school population and the general norms. They concluded that the gifted eighth graders were much more closely related in personality pattern to gifted high school boys and to the general adult population than to their own life age group. Similarly, the high school gifted boys differed greatly from the average high school population. In short, gifted students at the secondary school level seem to attain psychological maturity early and more closely resemble one another regardless of the wide range of chronological age. These results also have generally been either unnoticed or ignored in educational planning.

Several research studies have abandoned the search for gross emotional problems in the gifted and have searched instead for subtler indices of differences.

Lucito (1964) compared 55 bright (CTMM 120+) and 51 dull (CTMM 82-) sixth-grade children on an Asch-type task which attempted to measure their behavior along an independence-conformity continuum. The children were brought into a room in groups of six and asked to look at three lines and identify which line was the longest. The differences in line length were easily identifiable, but the problem was complicated by the administrator who provided each child with false information on the performance of the other five youngsters in the group. In some instances, the youngsters were given information that the other five members of his group had chosen the wrong lines before he had to register his own decision. His choice was either to follow the group members in a decision which was manifestly wrong or to reject the group and trust his own perceptions.

A comparison was then made to see if the bright or dull children tended to conform more to the false judgment of the group than to their own perceptions. Results indicated that the bright children, as a group, were significantly less conforming to their peers than were the dull children. None of the dull children fit into the most independent category of behavior as defined by Lucito, while 29 percent of the bright children fell into such category. These results would support the contention that increased intellectual ability does seem related to a more independent and less conforming behavior.

Independence

Smith (1962) compared a group of 42 superior and 42 average adolescents matched on social class status, chronological age, religion, sex, and nationality background. Students scoring over the 95th percentile on intelligence tests represented the superior while the average was represented by students who fell between the 25th and 75th percentiles on the same tests.

The students were given the Thematic Apperception Test and interpersonal adjective check list that provided data on self and self-ideal concepts. In addition, teacher and classroom evaluations of the interpersonal behavior of the subjects were also collected. The most significant difference between the gifted and average groups was found in independence and dominance, with the gifted being significantly higher on these dimensions. No differences were found between the groups in responsibility or cooperativeness, self-acceptance, or accuracy of self-perception.

On the Thematic Apperception Test, the average group indicated more themes of a dependency-weakness-conformity basis than did the superior group but no differences were found on the other dimensions. As other investigators have found, when the socioeconomic variables are controlled, the differences between gifted and average are less dramatic than otherwise occur. The significant dimension of independence-dominance, however, fits in well with the previous work by Lucito and suggests that high intelligence may be a contributor to the degree of independence and dominance shown by the student.

Are the favorable personality characteristics associated with gifted individuals really caused by their intellectual giftedness or by some other factor? The crucial but often overlooked study by Bonsall and Stefflre (1955) throws some interesting light on this question. A sample of 1,359 high school senior boys were given the Primary Mental Abilities test and the Guilford-Zimmerman Temperament Survey. Enough information was obtained from the students to enable them to be classed on the Alba-Edwards scale on occupations. When the gifted youngsters were compared with youngsters of average intelligence, the usual results were found. The gifted boys were superior in thoughtfulness, general activity, restraint, ascendance, emotional stability, objectivity, and masculinity. *However, when these comparisons were controlled for socioeconomic level so that only the average youngsters from high socioeconomic level were compared with gifted youngsters in the same level, then little or no differences were found between the two groups.*

This result leads to the interesting speculation that the differences seen in comparisons of the personality of gifted and average children are really due more to socioeconomic status than they are to the factor of intellectual giftedness itself. Bonsall and Stefflre conclude, "It is possible that Terman in describing the multiple superiority of the gifted child is simply describing children from the upper socioeconomic levels?" If this is so, many of our assumptions about the "differences" of the gifted which call for special educational approaches and methods will need to be reconsidered.

Summary

The evidence available regarding the superior emotional adjustment of the *intellectually gifted* child seems very strong. It is found consistently, whether the measuring instruments are teachers' ratings or personality tests, and whether the evaluation is on the present status of the child or follow-up studies of his later life. Whether similar results would be found in the *creatively gifted* is an interesting question dealt with in the next section.

Independence appears to be a particularly differentiating feature of gifted children and this fact has some obvious implication for educational planning.

There is a growing suspicion that the importance of intelligence in the development of personality characteristics may have been overestimated. We have demolished the point of view that high intellect is associated with instability. In its place, however, we have added the concept that high intellect has actually *aided* a person in making a good adjustment. Now studies that rule out other factors such as family stability or social status seem to find less significant relationships in either direction between intellect and stability.

Social Adjustment

What of the social adjustment of the gifted child? Is he shunned by his intellectually average colleagues? Does he form a close-knit clique, associating only with others of his own ability level? What happens to his social adjustment under conditions where special programs for the gifted are initiated? All of these questions are of practical and theoretical importance to school teachers, psychologists, and administrators. While a number of research studies are now available on this subject, it is fair to say that none of these questions can now be answered with complete confidence.

Whenever investigations are made of the social adjustment of gifted children in a school setting, the studies almost invariably indicate a superior social adjustment for the gifted. Gronlund (1959), in summarizing these studies, stated, "Where the sociometric status of individuals has been correlated with their intelligence test scores, low positive correlations have been generally obtained."

Elementary School

One illustration of the generally positive relationship between intelligence and social acceptance can be seen in Table X taken from Gallagher (1958b). This table relates intelligence to the number of friendship choices received in grades two through five in a midwest

TABLE X. THE RELATIONSHIP OF INTELLIGENCE TO SOCIAL POPULARITY—GRADES TWO THROUGH FIVE

(after Gallagher, 1958b)

Binet IQ Equivalent Groups	N	Number of Choices Received	Average Choices Received
132+	18	114	6.33
116-131	95	463	4.87
100-115	147	617	4.20
84-99	61	220	3.61
68-83	11	31	2.82

university community of superior socioeconomic status. The gifted children with IQ scores of 132 and above obtained an average of more than six friendship choices as opposed to an average of fewer than four for the children under IQ 100.

In another analysis, Gallagher (1958a) attempted to discover whether the bright students restricted their choices to other bright students or whether the average students picked average students. In grades two, three, and five, the intellectual ability of the child seemed unrelated to the intellectual ability of the chooser. In grades four, however, a definite relationship was discovered, with the bright children choosing other bright children and average children choosing other average children for their friends. This scatter of friendship choices agrees with Gronlund's conclusion that "there is little *direct* relationship between intelligence and the degree of acceptance by peers."

One of the other important factors that seem to be related to social popularity in children is propinquity or geographic nearness. A comparison of the friendship choices with distance from the child's home revealed highly significant relationships at each grade level and suggests that many of the social choices of the children in school are based on out-of-school contacts and neighborhood friendships.

When the extremes of intelligence are compared, the gifted show quite clearly their social superiority to mentally retarded children. Miller (1956), comparing superior, average, and retarded children, found the gifted children superior and able to predict the social status of other children more successfully than could children in the other groups. Gallagher (1958a) also found that gifted children were slightly superior to the others in their ability to guess who would pick them. Thus, the intellectually bright children seemed also to have somewhat superior social perception. Such social popularity does not square with the popular image of the bright youngster being a snob and acting superior to others.

Silverstein (1962) investigated this problem. He recorded the social choice behavior of five different IQ groups composed of 350 fifth grade pupils. The groups were divided by ten IQ point ranges. Group A, the top group had a 130 IQ or above on the Otis test; the bottom group consisted of students of 99 IQ and below. Each of these pupils were administered the Ohio Social Acceptance Scale which requires ratings of every child in the class by every other child on a five-point friendship scale. Silverstein believed that snobbishness would be represented by a person's expectation to be more favorably accepted than he is willing to be accepted by others. There were no differences between ability levels. In every IQ group, there was the expectation to receive favorable ratings that were greater than those that they were willing to hand out to others. It may be more blessed to give than receive, but our expectations generally run in the other direction.

Secondary School

Martyn (1957) conducted a study of the social adjustment of gifted and highly gifted children in grades four through twelve in the Palo Alto, California, schools and was able to obtain information on the social acceptance of 354 gifted subjects as compared to the social adjustment of over 3,000 other students on the Cunningham Social Distance Scale. Martyn found, as many other investigators before him, that the social acceptance score for the total group of gifted children was significantly greater than that of their classmates. However, the mean acceptance score of the 43 gifted students at the high school level and the 91 gifted students at the junior high school *was not significantly higher than the averages of their almost 900 classmates.*

Thus, while the gifted children were more popular at the elementary school levels, they were not significantly more socially acceptable than their classmates at the secondary school level. This result seems to support the popular observation that intellectually superior children are at their lowest peer popularity level during the high school period where the peer values are the most important. The gifted youngster who is concerned about his social status may be tempted to deliberately mask his talents in order to gain the desired social popularity and prestige which appear to be especially important at this age.

Why Are the Gifted Popular?

Although many investigators have indicated that gifted children tended to be more socially popular than children of average intellectual ability, there remains the question as to whether the children are being chosen because of their high intelligence or because of some of their many other favorable characteristics, personal and otherwise. Tannenbaum (1959) made an attempt to distinguish the characteristics of giftedness from the person himself by writing descriptions of stereotyped fictitious students. These students combined, in some way, three general characteristics; they were either *brilliant* or *average, studious* or *non-studious,* and *athletic* or *non-athletic.* These three characteristics were then listed in all possible eight combinations of these three characteristics, and 615 juniors in a large New York City high school were asked to respond to the particular combination of characteristics which most appealed to them.

On the basis of mean acceptability ratings, the characteristics were ranked as:

(1) brilliant—non-studious—athlete
(2) average—non-studious—athlete
(3) average—studious—athlete
(4) brilliant—studious—athlete
(5) brilliant—non-studious—non-athlete
(6) average—non-studious—non-athlete
(7) average—studious—non-athlete
(8) brilliant—studious—non-athlete

A comparison of the ratings of the *average* and *brilliant* characters revealed no significant difference, nor were there differences found between the brilliant athletes and non-brilliant athletes. However, these results did suggest that "academic brilliance *per se,* as compared to average ability, is not a stigma among adolescents, but when combined with other relatively unacceptable attributes it can penalize its possessor." The non-studious athlete may demonstrate outstanding brain power without fearing social derogation by peers. However, a display of brilliance by one who is studious and indifferent to sports constitutes a definite status risk.

But of what does this "popularity" consist? It is a "pal" relationship or is it the social bond between a leader and a follower? Pielstick (1959) suggests that the gifted child is a type of ego ideal to the average youngster. A natural next question is, Are there special leadership characteristics in the gifted?

Cassel and Haddox (1959) compared the scores of 60 gifted and 100 typical high school students on two leadership tests. The mean IQ of the gifted group was 125 and 103 for the average students. The LQT Test assessed the individual's philosophy of leadership with categories of personal integrity, consideration of others, mental health, technical information, decision making, and communication. On this test, no differences were found between the gifted and intellectually average students.

On the LAT Leadership Ability Test there are four parts which include tendencies toward autocratic aggressive, autocratic submissive, democratic, and laissez-faire strategies. On this test, there was a difference between the gifted and the average, with the gifted emphasizing the use of parliamentary procedure decision processes and minimizing the use of more autocratic or laissez-faire patterns.

Summary

In summary, it is possible to say on the basis of available research that gifted children are, as a group, almost invariably more popular and more socially accepted than children of other levels of intellectual ability. It is not all clear that high intelligence *causes* better social popularity or whether the gifted are capitalizing on other aspects of their personalities or family situations to gain their favorable social position.

What we really don't know is how social acceptance affects the other areas of adjustment. Does high social adjustment sometimes come at the expense of limiting academic performance? Do the gifted deliberately avoid the appearance of braininess in order to stay popular? Many people believe so. Can the gross judgments of social acceptance be refined into meaningful components such as leadership, respect, warmth, etc.? And what can these tell us about the gifted? These are important areas for future research.

Children of Remarkably Superior Intelligence

Special concern has been felt for those students who are found at the very top of the distribution in performance on intelligence tests. While the results of Terman and his co-workers removed many of the questions regarding the positive characteristics and adjustment of the youngster of superior intellectual ability, serious questions remain regarding the problems, within the educational program, of children whose performance classifies them as 1 in 100,000 or 1 in 1,000,000. The research conducted on these youngsters is very sparse, one reason no doubt being that they are hard to find in sufficient number.

Much of the investigations have been case studies. The classic example of this approach is provided by Hollingworth (1942), who did an intensive analysis of twelve children who scored above 180 IQ on the Stanford-Binet. On the basis of this small sample, Hollingworth suggested that this type of youngster was likely to have a difficult time adjusting to school. She concluded that they have special problems in finding hard and interesting work at school, in avoiding a negativistic attitude towards authority, and in tolerating others of lesser ability.

It is interesting to note that ten of the twelve children in this classification were first born, and five were only children. In all cases, their very high intelligence was noted quite early in life, and all of the parents came from a middle class or upper-middle class background. Even in such a selection the variation *within* the group should be noted. Hollingworth suggested that four of the subjects showed notable signs of creativity; however, another four gave no indication of marked constructive originality at all.

Other investigators have concentrated on the social adjustment problems of these youngsters. Terman and Oden (1947) in a small aspect of their larger research found 25 youngsters of extraordinary intellectual ability (IQ 180+). These tended to fall more into the bottom range of the social adjustment scale, although the range of adjustment within the group was wide.

Gallagher and Crowder (1957) compared the social adjustment of 15 youngsters of Binet IQ 165 and above with youngsters ranging in Binet IQ ranging from 150 to 165. In this comparison the higher IQ group tended to have slightly more social problems. Thus, there did seem to be some reason to suspect that the optimum social adjustment level (IQ ranges between 125 and 155) was as Hollingworth and Terman had suggested. There is some indication from the work of Gallagher and Crowder that the nature of the group influenced the social acceptance of the gifted youngster. That is, if a highly gifted child was in a group of average or below-average ability children, he was more likely to have social problems than if he was a member of a group of high ability children.

Kerstetter (1952) tended to substantiate this position. She studied 25 children with Binet IQ 160+ in special classes for gifted children in New York City. These highly gifted children were found to be, on the whole, socially well adjusted, and there seemed to be little relationship between very high intelligence and poor social adjustment. Thus, in a situation where the very high IQ child did not differ dramatically from the average ability of the group in which he was placed, he was able to form more harmonious relationships.

Anastasiow (1964) studied the self-concepts of a group of 23 very gifted students who had either a WISC IQ score of 145 or a Binet IQ score of 155 or above. Their performance on the STEP battery in reading and mathmatics was compared with their performance on the Sears-Spaulding Self-Concept Test, which measured self-assessment in such fields as physical ability, social relations, mental abilities, human relation skills, etc.

In order to draw a comparison, the author divided the students into those performing on the 99th percentile on the reading and mathematics tests who were called the *high achievement* group, and all others who were called the *low achievement* groups. These two groups were then compared on their performance on the Self-Concept Scale. Anastasiow found the high achievers tended to have high self-concepts in physical abilities and social relationships with their peers. Even at this rarified level of intellectual performance, it is possible to see how self-concepts influence the achievement of the students. It is unlikely, however, that the difference in academic performance would be noted by the teacher since the "low achievers" were still mostly performing in the 90th percentile in the achievement tests and would hardly be considered academic problems from the standpoint of the teacher, who is probably giving them all A's for their academic performance. This is an interesting illustration, however, of how good performance could be even better given more favorable attitudes toward oneself.

These limited results again illustrate the complexity of variables that influence school performance and student adjustment. No single factor, such as an abnormally high IQ, by itself can determine social adjustment. The most it can do, in conjunction with other factors, is to predispose a youngster in certain directions. The predisposition in this case is to a lower social adjustment for children of extraordinary performance, but a good proportion of these students have excellent social relations, and any generalization made on this subject would have to recognize the many exceptions.

CHAPTER 4

THE HIGH CREATIVE

In periods of stability and tranquillity, it makes educational sense to honor and support the student who possesses the ability to memorize past wisdom and the temperament to follow it. But in periods of drastic cultural change, educational goals and heroes change also. In this period of revolutionary ferment and continued technological development we seek the new Renaissance man who is willing to ride the wild horse of change and tame it to his own uses. So we seek the adaptive, the flexible student who shows originality, a desire for intellectual adventure, and a healthy skepticism for the unthinking application of past wisdom to new problems. Nothing could be more certain than that such an individual will not be found with tools that served other purposes—so the search for the creative man and the potentially creative student has involved problems of criterion and measurement which have marked the first half of the 1960's.

Search for a Criterion

One of the central problems of the research person who attempts to investigate creativity is the problem of an adequate criterion. Who is a creative person? If he wants to compare creative individuals with noncreative, how does he find the creative ones? What will satisfy him as a definition of the creative individual? While the educator is inclined to look at such problems as the business of the research person and is often somewhat bored by discussion of such technical problems, it is well for the educator to realize that decisions made at this time determine the results obtained.

Unless one intends to study the biography of universally noted creative individuals such as da Vinci or Shakespeare, one is reduced to using judges' ratings or psychometric results in identification of creativity. The judges may be either peers of the individual or professional research persons using some scale to distinguish between the creative and the noncreative. None of these methods are without substantial disadvantage, and it is up to the research person and the educator to decide whether they are willing to live with the disadvantages of the particular method they wish to use. It has long been recognized that biographies often tell us more about the biographer than about the subject at hand. The selective bias that may be used in collecting material for presentation is only one of many problems with this method.

If we use peer judges, as for example, fellow architects, to identify creative and noncreative architects we are still faced with an unstated criterion in the judge's head which he used to make his decision. Finally, the psychometric definition still has to face the problem of validity. Some demonstration has to be made that the person scoring high on these measures actually does turn out to manifest creativity in a social and occupational sense.

Most of the studies on adults have concentrated on the biographical or the comparative studies of successful or creative persons in a given field of endeavor compared with an average person in that area. It is not the intent of this paper to go into detail regarding the information collected on adults. An annotated bibliography by Stein and Heinze (1960) is a good starting place for a person interested in this subject.

In a recent summary, Stein (1962) enumerated the characteristics of creative individuals as found in the studies of the creative adult. These characteristics are:

1. Self-assertive, dominant, leading, initiative, aggressive, self-sufficient.
2. Less repressed, less inhibited, less formal, less conventional, Bohemianly unconcerned, radical, low authoritarian values.
3. Persistence of motive, liking and capacity for work, self-discipline, perseverance, high energy output.
4. Independence and autonomy.
5. Constructively critical, less contented, dissatisfied.
6. Widely informed, wide-ranging interests, versatility.
7. Openness to feelings and emotions, "feeling" more important than "thinking," more subjective, vitality, enthusiasm.
8. Aesthetic intelligence, aesthetic judgment, higher aesthetic values.
9. Low economic values, poor businessman.
10. Freer expression of what has been called feminine interests and lack of masculine aggressiveness (in men).
11. Little interest in interpersonal relationships, do not want much social interaction, introverted, low on social values, reserved.
12. Emotionally unstable, but capable of using their emotional instability effectively; not well adjusted by psychological definition, but adjusted in the broader sense of being socially happy and useful in work (pages 82-84).

In general, the studies of the creative adult have concentrated more on personality characteristics and less on cognitive abilities that have been the basis of the psychometric type of definition more commonly used with students.

Creativity and IQ

Dissatisfaction with the assumption that the IQ tests measured the broader conceptualization of human intelligence began almost simultaneously with the development of the first IQ test itself. It was obvious to any intelligent observer that there were certain valued aspects of human intelligence, such as ability to be original or to show judgment or foresight, which were not measured by these tests. However, education is, by nature, a pragmatic field. Its decision making is not determined by the far future or by theoretical inconsistencies, but rather by the inexorable pressures of tomorrow morning, where decisions involving the lives and futures of children cannot be delayed.

Thus the IQ tests, imperfect though they were, had vast superiority over the other methods of determining the ability and aptitude of the younster for school-related subjects. As such, they have been used enthusiastically and sometimes inappropriately. With any other useful tool, even though imperfect, replacement or modification must provide some alternative measure.

It is in this regard that the theoretical structure of intellect of J. P. Guilford (1956, 1959) has had a substantial impact on education. His battery of tests, obviously distinctively different from the usual IQ test, presented both a theoretical basis and measuring instruments for moving away from the IQ concept. What was needed, however, was some distinctive research project or study which illustrated to some degree the utility of these theoretical concepts. It is in this framework that the study of Getzels and Jackson (1962) played an important role.

Occasionally there is a research study which so fits into the current trends and concerns that it becomes a veritable launching pad that sends the investigations and interests of the field in a demonstrably different direction. The research study itself may not have technical excellence, and may even have serious flaws, but it does have an idea that crystallizes in the mind of the reader thoughts he has vaguely held on the subject. The basic idea of the Getzels and Jackson study was that there are children of high talent in the creative dimension who are not recognized by standard intelligence tests and whose characteristics, family background, interests and background are demonstrably different from the group that we have been used to calling "the gifted."

Since the Getzels and Jackson research project (1962) has received such great publicity, both acclaim and censure, it will be reviewed in some detail here.

The basic sample on which the research was conducted was from the University of Chicago Laboratory School. All of the students from sixth grade through the senior year in high school were administered a broad series of measures on intelligence, emotional adjustment, morality, and creativity. The creativity measures consisted of five scales in which the students' ability to give a large number of answers and original responses was judged. From this larger sample, the investigators then chose two samples, one labeled "high IQ" and the other "high creativity." The first of these was selected by taking those who scored in the top 20 percent of the total sample on the IQ, but not in the top 20 percent on measures of creativity. The "high creativity" group was selected by taking those who scored in the top 20 percent on creativity measures but not in the top 20 percent on IQ. The group of students that scored high in both creativity and IQ were not included in this comparison.

This selection resulted in a sample of 28 youngsters in the "high IQ" group and 24 in the "high creativity" group, roughly equally distributed by sex. These two groups were then compared on all of the other measures that were collected. It was the striking number, and the direction, of differences that have led to the further interest in the study. Their results may be summarized as follows:

1. Despite a mean difference of 23 IQ points between the "high creativity" and the "high IQ" group, the two groups were not different in school achievement.
2. In teacher preference, the teachers showed an apparent preference for the "high IQ" child over the average of the total school population. The rating for the "high creativity" students was not significantly different from the total school population. There was no statistically significant difference between the rating of the two groups, although the trend of the teacher ratings was in favor of the "high IQ" group.
3. The "high IQ" group appeared to be composed of social conformists while the "high creativity" group was mostly asocial and not influenced by common cultural values. The "high creativity" child rated IQ scores, character, and goal-directedness lower than the "high IQ" group. The "high IQ" group rated such variable as humor, social stability, and a wide range of interests lower than the "high creativity" group.
4. The "high IQ" group showed a desire to possess personal qualities which would lead to success in adult life. The "high creativity" group was more interested in seeking satisfaction for their interests and aspirations without regard to their own social success.
5. A close relationship was found in the "high IQ" group between self-ideal and qualities that they believe the teachers prefer. There was a limited relationship between teacher-approved values and self-values in the "high creativity" group.
6. The "high creativity" students showed imagination and originality in their written production unmatched by the "high IQ" students. They presented stories which were less stimulus-bound and which used more humor, novel situations, and unexpected endings.
7. In terms of family background, "the overall impression of the high IQ family is that it is one in which individual divergence is limited and risks minimized, and the overall impression of the high creativity family is that it is one in which individual divergence is permitted and risks are accepted." (pp. 65-76)

Critical response

The bright spotlight and critical attention that was focused on the Getzels and Jackson material also tended to expose in bold relief the cracks and flaws in the research design which a number of their furious critics hastened to expound upon.

Thorndike (1963) pointed out that Getzels and Jackson had emphasized the low correlations obtained between IQ and the creativity tests (thus indicating that they were *not* measuring the same characteristics). However, the correlations *between* the creativity tests given in the study were no higher than between the creativity tests and IQ. By their own argument, Thorndike pointed out that they were no more justified in calling the conglomeration of measures "creativity" than other persons are justified in combining these tests with standard IQ scores.

Cronbach (1962) emphasized that the authors refer to the group as "high creativity" without external validation but merely as an assumption based on high scores on these tests. He further noted that the one group that should have been studied included those students high on *both* creativity tests and IQ, since these would presumably represent the most effective students. He believes that Getzels and Jackson had left the definite impression that the characteristics of the "high creativity" group were highly desirable and should be sought after in the educational system. Instead, Cronbach suggests that we may well find out that the "high creativity, low IQ" group may really represent an irresponsible *Mad Magazine* mentality and that we may well consider how these characteristics can be reduced rather than fostered.

DeMille and Merrifield (1962) pointed out that while the authors left the impression that teachers preferred the "high creative" over the "high IQ" student, their own data did not support such a statistical conclusion. These were not the only flaws noted. However, what the study did accomplish beyond any doubt was to open the door to investigations in this realm labeled creativity. They created a set of interesting hypotheses which gave direction to the pursuit of other investigators.

Academic Performance

One of the ways to demonstrate the usefulness of the new "creativity" measures in an educational context is to demonstrate that they can aid in the prediction of educational success, even though they do not correlate highly with IQ scores. When Getzels and Jackson found no differences between their "high IQ" and "high creative" groups despite an average IQ difference of about 24 points, the implication was that high creativity scores compensated the creative group for their lesser IQ scores so that their academic performance came out the same.

Torrance (1962) reported eight replications of the Getzels and Jackson study using five elementary schools, one high school and two college settings. In general, students who scored high in creativity scores did as well as students who scored high on IQ scores. An exception to that generalization is worth noting: When the IQ scores of the "high creative" students dropped below 120, they no longer performed as well academically. It would appear, on this basis, that it takes a certain minimum of abilities, as represented by a cutoff score of around 120 IQ, to perform in a superior academic manner. Once this floor has been reached, then further academic superiority depends, in part, on creativity scores.

Yamamoto (1964) attempted to establish the point that measures of creativity were related to achievement performance in school by a slight variation on the established theme. Two hundred seventy-two subjects at the University of Minnesota High School were administered a battery of the Minnesota Tests of Creative Thinking, the Lorge-Thorndike Intelligence Test, and the Iowa Test of Educational Development. When the influence of intelligence test scores were eliminated by means of analysis of covariance, highly significant differences were still found between the achievement of the "high creative" and "low creative" students, those falling in the top and bottom 20 percent of the population. These results tend to confirm earlier statements that performance on creativity tests does add a significant component to total performance and achievement. Yamamoto concluded that these results also supported the Torrance position that when the IQ score obtained is higher than 120, then creative thinking abilities become important in school achievement.

Cline, Richards and Needham (1963) attempted to compare, by means of multiple correlation, the relative weight contributed by IQ and tests of creativity to criteria of academic performance. These criteria were teacher's ratings, scores on the STEP science test, science grade point average and an estimate of the student's involvement with science. These investigators found, as others had previously reported, that the tests of creativity contributed significantly to the improvement of the multiple correlation with the STEP science test, student involvement in science, and teacher ratings with the boys. The California Test of Mental Maturity IQ scores appeared to be a better predictor of science success with the girls, although some contribution was still made by the Guilford tests.

As a part of a larger study, Smith (1965) compared 60 fifth-grade children who had scored above 120 IQ on the Kuhlmann-Anderson Intelligence Test with children who had scored an IQ of between 90 and 120. These children were matched on the basis of sex, race, and socioeconomic situation, and according to school and classroom. Each of these 120 children was given a battery derived from the Guilford Structure of Intellect which included tests of intellectual fluency, flexibility, and originality in both the verbal and non-verbal dimensions.

On eight of the fourteen verbal creativity variables, the intellectually gifted were superior to the normal subjects beyond the .01 level of significance. No differences were found between the groups on the seven non-verbal factors, nor on the evaluative factor. These results would seem to support the contention that whenever there is a broad range of intellectual ability, those with high IQ's do better on so-called creativity measures than those of average or below average IQ.

Smith also found that performance on these tests were related to sex (girls outperforming the boys), race (white outperforming the Negroes), and socioeconomic status (the higher the socioeconomic status, the better the performance). These results held only for the verbal tests. On the non-verbal tests, children of lower socioeconomic status did relatively better. However, the differences between white and Negro subjects were significant on both the verbal and non-verbal dimensions. One must conclude that, as far as the verbal tests of divergent thinking are concerned, expected relationships in favor of higher socioeconomic, higher IQ, white and female were obtained.

One should be careful before overgeneralizing from a single study using factor analysis or multiple regression weights which attempt to show the pattern of variables associated to achievement or creativity. McGuire (1961) gave a battery of 22 cognitive and 22 non-cognitive measures to 144 junior high school students drawn from four Texas communities. He found that whenever achievement was used as a criterion variable (all other measures correlated with it) the pattern of weights, or emphasis of factors such as divergent thinking varied significantly from one community to another and also varied on the basis of sex.

The "High Creativity" Syndrome

With the emergence of a new set of measuring instruments purporting to establish the creative abilities of the students, much of the initial attention has been paid to technical matters as reliability and validity. Such an emphasis parallels a similar phase in the development of intelligence tests. Another emphasis was placed on establishing the characteristics of the "high creative" group.

Wallach and Kogan (1965) compared the performance of the entire fifth grade population of 151 children in a suburban middle-class school on creativity indices with more standard academic and intelligence measures such as achievement tests and IQ scores. These investigators found a reasonably high correlation between the ten creativity indices of .40 and a somewhat higher average correlation between the IQ and achievement indices of .50. The crucial point of the study, however, was that the average correlation between the creativity indices and the IQ indices was about .10, strongly suggesting that each of the sets was measuring a factor which was essentially unrelated to the other.

These investigators, like many others, have few illusions about the term *creativity* and use it only as a convenient verbal handle. They see two major elements being measured by the tests generally called creativity—first, the ability to produce abundant and unique associative content, and, second, the presence in the subject of a playful and permissive task attitude.

Wallach and Kogan then divided the 151 children in this fifth grade population into groups of *high creativity-high intelligence, high creativity-low intelligence, low creativity-high intelligence* and *low creativity-low intelligence.* This was done on the basis of the median score for the children at that grade level on a battery of intelligence and creativity measures.

In their comparisons, these authors found some of the same trends noted by Getzels and Jackson notably that the *high IQ-low creativity* child shuns spontaneity, has a low level of manifest anxiety, and tends to avoid thematizing in tasks of classification. An example of a thematic category would be combining a comb, lipstick, watch, pocketbook, and a door as belonging together because they all are used in getting ready to go out. Wallach and Kogan summarized their points on the four groupings as follows:

> *High creativity-high intelligence*: These children can exercise within themselves both control and freedom, both adultlike and childlike kinds of behavior.
>
> *High creativity-low intelligence*: These children are in angry conflict with themselves and their school environment and are beset by feelings of unworthiness and inadequacy. In a stress-free context, however, they can blossom forth cognitively.
>
> *Low creativity-high intelligence*: These children can be described as "addicted" to school achievement. Academic failure would be perceived by them as catastrophic, so that they must continually strive to make excellent grades in order to avoid the possibility of pain.
>
> *Low creativity-low intelligence*: Basically bewildered, these children engage in various defensive maneuvers, ranging from useful adaptations such as intensive social activity to regression such as passivity or the development of psychosomatic symptoms.

These results supported Getzels and Jackson on the possible usefulness of such divisions and also sustained the relevance of the criticism of others of the failure of Getzels and Jackson to report the performance of the *high creativity-high intelligence* or *low creativity-low intelligence* groups in their study; full understanding of the characteristics of these groups must involve a description of all four. It is useful to compare Wallach and Kogan's comments on the *high creativity-high intelligence* group that they can use both adultlike and childlike behavior with the summary comment by Barron (1958) that "the creative person is both more primitive and more cultured, more destructive and more constructive, crazier and saner than the average person."

Yamamoto (1965) gave a battery of creativity tests to 827 fifth-grade pupils that represented all students in a large suburban public school district. The students obtained composite scores for the characteristics of fluency, adequacy, flexibility, originality, and elaboration. Yamamoto carefully describes a series of smaller studies demonstrating inter-score reliability, test-retest reliability and validity of the creativity tests as measured against teacher ratings. All of these comparisons were positive and seemed to indicate that these composite scores possessed both validity and reliability.

These fifth-grade pupils were then divided into three groups: the top 10 percent, the bottom 10 percent and the middle 80 percent on the basis of their creativity scores. A small but significant correlation was found between the creativity scores and the group IQ test scores, agreeing with the results of other studies. There is also some indication that parental occupation and vocational aspiration were related to the creativity scores. The vocational aspirations of the children who scored high on creativity were more in the professional area while the youngsters who were poor in creativity tended to check "don't know" more often. There was a suggestion that the high creativity youngsters came from a higher socioeconomic level.

The pupils in the high and low 10 percent were than randomly assigned to experimental and control groups and a series of tasks were given to goups of five students. One of the five members of the group was from the high or low samples, while the other four members came from the middle group subjects. These groups were subjected to a series of tasks which involved presenting them with incorrect data to see if group influence swayed their judgment. On both tasks relating to perception and information, Yamamoto found little difference between the high creative and low creative student regarding susceptibility.

These results conflict with the earlier study by Lucito (1959) on the susceptibility of children of high intelligence vs. those of low intelligence, but it should be remembered that Lucito offered a prize for performance in these tasks to students while Yamamoto did not. This difference in motivation might well have caused this performance difference.

Cognitive Ability or Cognitive Style?

Another interesting aspect of the Wallach and Kogan work reported above was the low performance of the *high intelligence-low creativity* students on thematizing. Such performance did not represent a cognitive inability to perform in this area but rather a distaste for doing so. When the students were specifically requested to thematize, these "high intelligence-low creativity" students could perform just as well as the other groups. This would support the argument of Gallagher (1964) that much of what has been called creativity, in the cognitive sense, really represents a cognitive style or set of preferences in their performance. There is additional evidence that this style can operate to influence the kind of perceptions that a person has and thus selectively filter information received from the environment.

Witkin and his coworkers (1962) have used the labels "field dependent" and "field independent" to describe what seems to be a similar dichotomy to the Getzels and Jackson "high IQ" vs. "high creative" student. This distinction by Witkin and his associates is based upon a perceptual test called the Rod and Frame Test. A rod is attached to a frame in such a manner that both parts can move independently of the other. The frame can be tilted at various angles and the subject is then asked to place the rod in a vertical position. These investigators found that certain individuals are strongly influenced by the frame position in their attempt to place the rod vertically. Those individuals who performed poorly in this test had other consistent cognitive and personality traits. Witkin concluded that this "field dependence" was part of an entire style of life. If creativity and divergent thinking is in reality more a style of performance than a fundamental cognitive ability, this would also tend to explain the extreme sensitivity of these measures. The changes of instruction would be more understandable since, in effect, the test instructions represent a set.

Teacher Ratings

One of the controversial aspects of the Getzels and Jackson study was the attitude of teachers toward the creative vs. the high IQ student. There was a trend for the teachers to favor the high IQ student but no statistically significant differences were found. It is easy to make a case for such a preference since another characteristic of the creative youngsters was that they tended to enjoy playing with ideas rather than finding the correct or proper (teacher-directed) way to deal with the ideas. They also placed a high value on a sense of humor and a wide range of interests and did not accept adult standards of good achievement as the kind of goals that they would have for their own lives.

It can easily be seen how such combination of characteristics could cause considerable irritation to a classroom teacher who is bent upon completing a given topic or assignment in a limited period of time.

Richards, Cline and Needham (1964) compared teacher ratings of creativity on 120 secondary school science students with creativity and IQ test performance and found no differences in preference by teachers that could be related to measures of IQ or creativity scores. These results tended to contradict the suggestion of Getzels and Jackson that teachers preferred the high IQ student to the creative student. Due consideration should be given to the fact that these students were in science classes where "creativity" may be viewed somewhat differently.

Emotional Adjustment

The precise nature of the emotional status of creative individuals has been a matter of stimulating discussion for many years. The Terman findings that his group of high IQ children were more emotionally stable than the average did not really settle the question since there is some question whether Terman's group really included a large number of highly creative children. Before we discuss whether a certain group of students who score high on "creativity" tests are mentally healthy, we might review what we mean by mentally healthy.

The concept of mental health has stemmed from the initial concern with mental illness. Since most of the patients who have been described as mentally ill have large amounts of unmanageable anxiety, there was a natural tendency to assume that the absence of anxiety represents mental health. In recent years, however, some protest has been raised by this assumption. Barron (1958) spoke most convincingly on this point. He suggested that the psychiatric idea of mental health was of a well-adjusted, frictionless machine tended in a congenial fashion by a little mechanic known as the strong ego. Barron commented on the psychiatric consensus of a healthy person at a recent meeting:

> I heard warmth mentioned, but not heat; spontaneity, but not passion. No one had spoken of willfulness, fierce self-assertion, hatred of an established order. These are often the stamp of the creator, and, if adaptation and

> maturity of human relations are the essentials of psychological health, then the creative genius is frequently not healthy.

Feldhusen, Denny, and Condon (1965) compared the performance achievement and creative thinking abilities of 50 high-anxious males, 50 high-anxious females, 50 low-anxious males, and 50 low-anxious females from a seventh and eighth grade population in a small city school system. These 200 students were drawn from an original sample of 273 subjects. The basis for the selection was their performance of the Sarason General Anxiety scale. These high- and low-anxious students were then compared on the School and College Achievement Test, the Sequential Tests of Educational Progress, Creativity Self-Rating and tests of divergent thinking. While the high-anxious students were significantly poorer in performance in both aptitude and achievement, no significant differences between high and low anxiety groups were obtained with regard to the creativity measures.

The intercorrelation patterns were different for boys and girls, with the boys showing negative correlation between performance in achievement and aptitude with anxiety. In other words, high anxiety boys did poorer academically, while no such relationship was found with the girls. Both sexes showed a high positive correlation between performance on aptitude and achievement tests and measures of intellectual flexibility. The boys showed consistently significant correlations between academic performance and ability and originality scores. In no instance were significant correlations obtained for the girls between originality and school related activities. Such results did not agree with a previous study by Ruebush (1963) who found negative relationships between anxiety and creativity.

Flescher (1963) obtained a sample of 110 children from a sixth grade in a New England community. These children were divided into four groups:

a. Intellectually talented—IQ above 130 but below the top quarter on creativity tests.
b. Creatively talented—in the top quarter on creativity tests but below 130 IQ.
c. Twice talented—above 130 IQ and in top quarter on creativity test.
d. Nontalented—below 130 IQ and not in the top quarter on creativity tests.

A factor analysis of 23 variables including achievement, intelligence, creativity and anxiety measures revealed the creativity test related to neither achievement nor intelligence. Further, some of the divergent thinking tests did not relate highly to each other. Such results seem to vary according to the sample or the situation.

But suppose the relationship between anxiety and creativity were curvilinear in nature where both extremely low and extremely high anxiety were detrimental to creativity, but a moderate amount of anxiety was facilitating. Most of the available research findings would fit that crude model.

Torrance (1960) selected the most creative boy and girl in each of 23 classrooms, according to a battery of tests of creative thinking.

and matched them with other students for sex, class, and IQ scores. These two groups were then compared on peer nominations, teacher nominations, and some personality variables which were obtained from the House-Tree-Person test. The comparison identified three distinctive characteristics of the creative children. First, they had a tendency to gain a reputation for having wild or silly ideas; second, their work was characterized by high productivity of ideas "off the beaten track"; third, their work was characterized by humor and playfulness as reflected in their drawings.

Role Influences

One of the more general observations made on creative adults was a trend towards the reversing of sex identification. The creative woman seemed to be more masculine and the creative man seemed to be more feminine. One possible explanation for this observation lies in the dimension called openness to experience. The adoption of strict sex role characteristics leads not only to a clearer description of who you are, but also a clearer description of who you aren't. Thus, the girl who has adopted the feminine role may well reject certain areas of experience that are perceived as belonging to the masculine role, such as experimentation, exploration, mathematics, etc. In a similar fashion, the boy who adopts the masculine role would become nervous when confronted with his own interest in fine arts. The boy who is not bound to this sex role identification, however, can well open his range of experience to a richer environment in which to be creative; also, he would swing between the two sex roles and appear to be less than the extreme in either direction. Some evidence from studies done with younger children is available.

Torrance (1965) has reported a series of experiments on intermediate grade children to support his thesis that expected sex roles and differential rewards for boys and girls in our culture produce different which, in turn, determine their degree of productive thinking. He found, for example, that a sample of fourth grade boys appeared more reluctant to write poems and plays, keep diaries, make up original dances, and write letters to persons in foreign countries than girls. On the other hand, the gifted girls were more restricted than the boys in spontaneous activities such as exploring caves, reading science magazines and books, mixing colors, planning experiments, keeping weather records, etc. In general, there were more "off-limit" areas for girls than for boys.

Their choice of occupations also reveals the influence of perceived sex roles. The girls were more interested in such things as acting, the fine arts, music, dancing, and writing. The boys were more interested in exploring, hunting, archeology, inventing, diplomacy, racing, etc.

Torrance (1965) compared a group of 26 gifted girls and 24 gifted boys boys, chosen for their high achievement and intelligence, on various measures of creative thinking. He found significant differences in favor of the girls at the elementary level on tests of causal hypotheses, asking questions, and non-verbal elaboration. The only significant difference in favor of the boys was in non-verbal originality. However, at the junior high school level, with another sample of 35 boys and 40 girls, he found boys performing more effectively in the area of nonverbal fluency, originality, penetration and on fluency and flexibility on a consequences test. Torrance also presented some initial evidence to the effect that teachers seemed to reward creative thinking in boys more than they did in girls.

Gallagher (1965) found substantial differences between 86 gifted boys and 79 gifted girls at the seventh through tenth grade level on classroom expressiveness. Using a classification system for cognitive performance based on Guilford's structure of intellect, five consecutive class sessions were recorded and analyzed in each of twelve classrooms. Classroom scores were adjusted for total production in a particular classroom in each of the major category areas. Significantly greater production was shown by boys on expression in Cognitive-Memory, Convergent Thinking, Divergent Thinking, and Evaluative Thinking. Since similar differences were not obtained on written measures of these characteristics, the author concluded that these classroom differences may represent differences in perceived sex role behavior rather than basic differences in intellectual abilities. Sex differences in this study were also obtained on measures of self-concept and attitude. The gifted boys showed a higher self-concept but revealed a lower opinion of family and other people than did the girls.

Family Patterns

Getzels and Jackson reported differences in the family values and attitudes of "high creative" and "high IQ" students. From a sample of 176 academically talented secondary students, Gallagher and Jenné (1966) selected 68 subjects who fell into one of three categories: *high IQ-low divergent* (students who fell into the top third of IQ scores but the bottom third of divergent thinking scores), *low IQ-high divergent* (students who fell into the top third on divergent scores but on the bottom third on IQ scores), and *high IQ-high divergent* (students who fell into the top third on both measures). These students were compared on their level of classroom expressiveness, on measures of attitudes, on self-concept and on parental attitudes related to independence granting and achievement inducing.

Substantial differences were noted in the results that differed according to sex. In the talented girls, the *high IQ-high divergent* group were more expressive in the classroom, were rated higher on cognitive abilities by their teacher and had mothers whose independence granting tendencies were less marked that the *low IQ-high divergent* girls.

In the boys, no significant differences were found between groups on classroom expressiveness although the teachers rated the *high IQ-low divergent* boys significantly higher on cognitive efficiency than the *low IQ-high divergent* boys. A significant relationship was also found with the fathers of the *low IQ-high divergent* boys significantly lower on achievement inducing than the father of the *high IQ-low divergent* boy. This last result was an unexpected one and needs corroboration. Although the groups were small in this particular experiment, they tended to confirm some of the previous results on cognitive style differences.

Yamamoto (1965) presented a needed critique of tests of critical thinking and some suggestions for establishing criteria. He points out that in the use of rating scales on creativity, the characteristic must be clearly defined so that personal interpretation and biases are avoided. Unless the definitions are specific, other characteristics such as brightness or good personality or active participation might be the variables actually rated by the teacher. Peer nominations have the same weaknesses of the ratings of supervisor and teacher. Yamamoto recommends that these ratings be checked by an indepenednt third party.

He also encouraged further correlation studies between so-called creativity measures and existing variables of aptitude, achievement, interest values, etc., so as to draw these measures into a conceptual network and thus to be able to explain and interpret them more effectively. Also longitudinal studies are needed to be sure that the student who is rated a creative or productive thinker actually justifies such ratings with productive work at a later time.

Department of Redundant Research

One of the studies that is needed least in this field is another attempt to correlate IQ scores and creativity scores. By now, we know that if the range of IQ scores is attenuated or limited, then the correlation between some composite creativity scores and IQ scores will be moderately low, but still positive. What we don't know, however, is how to interpret these results. It may be due to the limited range of IQ scores, it may be due to the unreliability of the creativity indices, or it may represent a real difference in what the two instruments are attempting to measure.

By now, it should be clear to the reader that the various studies which fall into this Department of Redundant Research are those that can be done with the least effort. That is, of course, what made them redundant in the first place. What the field needs is studies that are not easy to do, such as the validation of creativity tests or experiments to evaluate the effectiveness of training programs in stimulating divergent or creative thinking abilities. It is harder to plow through the underbush than it is to follow a well-worn path. But if one's goal is to see something new, the painful way would seem to be the best way.

CHAPTER 5

THE UNDERACHIEVING GIFTED CHILD

In studying the general area of underachievement, we must first recognize that to seek a single answer to the question, "Why do many gifted children underachieve?" is a meaningless quest. One might as well ask why people become sick or why automobiles break down. There are many different reasons why children do not perform as effectively as they might. Therefore, the following section is not intended to be a search for the one elusive factor that causes underachievement, but rather an attempt to give an overview of the different factors which relate to problems of achievement.

Who is an underachiever?

What level of achievement must we expect of gifted children? This is not an easy question to answer. For the child of average ability, the easiest and most effective rule of thumb is that his performance is satisfactory if he can handle the curriculum at his grade level. Thus, a ten-year-old child of average ability who is in the fifth grade can be credited with doing reasonably effective work if he can perform adequately those tasks expected of an average fifth grader.

This is obviously not a proper standard for a child of high intellectual ability, however. We would be most disappointed in a child of high ability who could achieve no more than the grade level of his chronological age. But how much higher can we expect his achievements to reach?

One of the most natural developments in education was the proposal for an *Achievement Quotient* which superficially resembles the more effective *Intelligence Quotient*. The Achievement Quotient was achieved by obtaining an age score on an achievement test and dividing that by the mental age score obtained on an intelligence test. Thus, if a seven-year-old child obtained a mental age score of ten years, he would have to obtain an achievement of ten years on the achievement test in order to obtain an AQ of 100. This particular approach has many practical and theoretical flaws, some of which were reduced by a slight modification on the expected achievement formula by Horn (1941). In effect, the Horn formula suggests that the reading of the gifted child should be two-thirds of the way between his Life Age and his Mental Age on reading and associated subjects. Thus a child with a Life Age of seven and a Mental Age of ten would be expected to achieve somewhere around the nine-year level on reading and associated subjects.

Another type of definition, which relies less upon precise measurement, has been suggested by Gowan (1957). He defines underachievement as "performance which places the student more than a full standard deviation below his ability standing in the same group."

In effective terms, this means that gifted children who perform in the middle third of their group in scholastic achievement are labeled *underachievers* and those falling in the lowest third of their group in academic performance can be labeled *severe underachievers*.

The two most common indicators of achievement, or lack of it, have been grades or achievement test scores. These are then used in comparison with IQ scores to provide a definition of underachievement. Whether or not it makes a difference as to which is used is an open question. Pippert and Archer (1963) used both methods on a ninth grade class with surprising results. Using poor grades, fourteen boys and seven girls were identified, while poor test performance found seven boys and twelve girls. Only two youngsters were found by both methods. A larger study will be needed to corroborate these strange results.

Most of the early work on the gifted underachievers was done by Terman in his 40-year longitudinal study on the characteristics of gifted individuals. He and his associates (Terman & Oden, 1947) compared 150 men who, as determined by judges, made the most success out of their lives with 150 men who had the most trouble in their life work in achieving their tested potential. The total sample of men he had to draw on was over 700. He found that the key difference between these two groups of gifted men lay not so much in IQ scores as in the area of personality characteristics.

On rating scales that the men and their wives and parents completed, four areas were found that differentiated the successful and unsuccessful men. The same four areas were found on the self-ratings and on the ratings of wives and parents. These were:

1. Lack of self-confidence.
2. The inability to presevere; to stick to a task; to tolerate frustration while finishing a task.
3. The lack of integration of goals; not sure where they were going.
4. The presence of inferiority feelings.

A little-noted aspect of this study, but one of significance to the schools, is that these same characteristics differentiated these two groups when they were ten years old! In other words, the school records of these youngsters could have differentiated the underachievers and the achievers while they were still in elementary school. This points to the conclusion that these distinctive adjustment patterns do not go away naturally.

One important educational concern in the area of underachievement is how persistently these characteristics remain. The Terman and Oden study suggested that the pattern is consistent. If they change from one year to the next, influenced by transient factors such as an unsympathetic teacher or minor emotional upsets in the home, they carry little educational significance.

Shaw and McCuen (1960) studied 144 students in eleventh and twelfth grades who fell in the upper quarter of their class in intellectual ability. Those students whose grades were above average for the class were termed *achievers*, while those whose grades fell below average were termed *underachievers*. The authors then reviewed the past academic record for each of the students from grade 1 forward to see how well they had done in previous years. Through this analysis, it was possible to observe that underachieving boys started their poor academic performance at about the third grade level and continued consistently ineffective from that period on. Underachieving girls, however, did not reveal their tendencies to academic ineffectiveness until about the sixth grade level. This is one of a number of studies which suggested the possibility of a different set of personality dynamics underlining the underachievers in the different sexes.

The results of this study plainly indicate that underachievement (and high achievement) is not a casual matter determined by passing or incidental factors but is a consistent pattern of behavior continuing from one year to the next.

Self concept

How does the gifted underachiever perceive himself as compared to his more effective classmates? One of the more natural focuses for attention, following from the Terman study, has been the self-perception of such a student. How does he feel about himself, how does he perceive others in relation to himself, and what are his values and goals?

Morgan (1952) compared a group of college achievers with underachievers, all of whom had scored in the top 10 percent of their freshman class in academic aptitude tests. The major difference found between the two groups on tests of personality and interest was that the nonachievers tended to score high on the Psychopathic Deviate Scale.

The achievers scored higher in the areas of dominance and social responsibility. Since this term "social responsibility" is almost the exact opposite of the term "psychopathic deviate," there appears to be a single continuum ranging from social responsibility to antisocial values and attitudes which can differentiate the achiever and the nonachiever. Morgan also found differences in the achiever's patterns of interests. More achievers were interested in social service and welfare occupations (note the relationship to *social responsibility*), while the nonachievers had interest patterns which resembled those of persons in business or sales occupations.

You will recall that Terman found that persistence and drive to achieve were important differentiating factors for his achievers and nonachievers. On the characteristic of desire to achieve, Pierce (1959) found in a study of tenth- and twelfth-graders that both high achieving girls and high achieving boys valued achievement more highly than did the low achieving students, with the exception of the 12th-grade boys. The high achieving boys and girls valued the concepts of *school, work,* and *imagination* more than did their low achieving peers and also rated the concepts of *self, student,* and *competition* higher.

As one might predict on the basis of the theoretical structure above, Pierce found the low achieving tenth grade students scoring higher on both aggressive and withdrawn maladjustment, while the high achieving students were more active in school-related activities and leadership activities. In the general area of emotional adjustment, the high achievers also were better adjusted as measured by tests of personality.

There was a sex difference in the adjustment area with the low achieving girls making a more satisfactory sex-role adjustment than the low achieving boys. Pierce concluded that girls can make a good sex-role adjustment even if they are underachieving, but boys have more difficulty due to the higher expectations that the culture imposes on them.

Haggard (1957) reported the results of a five-year study of 76 children followed from grade three through grade nine in a laboratory school in terms of their achievement and the effect of various personality factors upon that achievement. He found that the high general achievers at the upper grade levels had largely accepted adult values and were striving to live up to adult expectations. "They saw their parents as being somewhat over-protective, pressuring for achievement, and lacking in emotional warmth (frequently they were correct)."

Four years later in grade seven, he discovered various changes taking place in children who remained at a high level of achievement. They had developed strong antagonistic attitudes toward adults and pictured them as inadequate and ineffective. At the same time they showed a marked increase in level of anxiety and decrease in originality and creativity. It would be interesting to compare trends in average children to see if this kind of pattern is as true of all children at the junior high school level as it is of the gifted in this special setting.

Haggard found that the group that seemed to be the best adjusted in terms of overall freedom from anxiety and guilt were the children who scored relatively high on tests of arithmetic! However, he is not inclined to give credit to the arithmetic curriculum for producing such a result. He interprets their performance in arithmetic as the result rather than the cause of good adjustment. Haggard concluded that "the best way to produce clear thinkers is to help children develop into anxiety-free emotionally healthy individuals who are also trained to master a variety of tasks."

In the Portland, Oregon, school system (1959), 49 underachieving boys from seven community high schools were matched with 49 high achieving boys on the school attended, socioeconomic status, and intelligence. The underachievers, more often than the high achievers, viewed academic achievement as incompatible with enjoying life, having fun, being well-adjusted, or having a good personality. Many more underachievers expressed relatively negative attitudes regarding school, teachers, and studying. Such negative attitudes do not imply, however, that the interests of the underachievers were more directed to other areas. Negative attitudes to school seem, instead, to be associated with narrow cultural interests. In accordance with Gough's theory of the asociality of underachievers, they more often indicated marked interest in risky, thrill-seeking activities, and wanted to be jet pilots, night club managers, etc.

There did not seem to be major differences between the two groups in social and emotional adjustment. Interestingly enough, the high achieving boys mentioned difficulties in their relationships with girls. In terms of friendships, these children, as expected, picked out other children with many of the same characteristics as themselves. Thus, the underachievers described their social clique as negative to school, as restless, as seeking excitement—violating adult codes and standards.

While most of the studies utilized rating scales and test data, some interesting results were obtained using a modified play therapy technique with underachievers. Walsh (1956) used a doll play technique to distinguish between the self-concepts of elementary school underachieving and achieving boys. She found that the low achieving children felt less accepted by their families, were more constricted in their actions, and were generally more negativistic and defensive.

The use of projective test devices like the Rorschach or the TAT has added additional tools in the study of the inner life of the underachiever. Combs (1964) compared 25 boys (WISC IQ 115+) above the median in grade point average with a group of 25 boys of similar characteristics but whose GPA fell below the first quartile.

A comparison of themes written by the underachievers in response to standard pictures showed they felt less adequate and less acceptable to others. They viewed peers and adults as less acceptable and showed less freedom and adequacy of emotional expression.

Nason (1958) obtained 22 pairs of boys and 22 pairs of girls drawn from 237 superior students at the secondary school level who had obtained an IQ of 125+ and a grade point average of 3.75 or higher. The low achievers had a grade point average of 3.0 or less. Nason summed up the comparison on school attitudes, future plans, etc., as follows. The high achiever:

1. Is satisfactorily adjusted personally and socially.
2. Includes college in his plans for the future.
3. Has a fairly specific vocational choice or plan.
4. Indicates that his parents expect him to go to college.
5. Feels no parental disagreement with vocational plans.
6. Senses a source of inspiration or encouragement to succeed.

The difficulty of analyzing studies which compare achievers and underachievers is trying to understand which is the chicken and which is the egg. Is the underachiever unhappy with school because of his past lack of success, or is his lack of success due to his unhappiness with school, or is there some subtle interaction between the two?

The underachiever's attempts to protect his own damaged self-image merely creates further difficulties in a school situation particularly when the teacher is unaware of the true meaning of his thrashing around. Table XI points out some of the statements often heard from underachievers and what they may really represent.

In summary, the underachieving child seems to have a portrait of the world as unfriendly and unsympathetic. The school is a threatening place where the activities are unrelated to success and happiness and the kind of life he wants to lead. Where do these

Table XI. PROTECTING THE BRUISED SELF-IMAGE OF THE CHRONIC UNDERACHIEVER

WHAT HE SAYS	WHAT HE MAY MEAN
School is terrible. Teachers are against me and they aren't any good anyhow.	If the system is bad, no real blame can come to me if I don't succeed in it.
I think I would like to be a jet pilot or a movie star or a politician.	I want to do thrilling and glamorous things but cannot stand a position with a long period of training preceding it or where sustained hard work is needed (rarely choosing surgeon, electronics engineer or president).
I really am not gifted and those tests are crazy anyhow.	The label 'gifted' puts the pressure on me to succeed. One way to take the pressure off is to lose the label.
Some people are lucky and some aren't. I wish I could hit it lucky for once. I dream about breaking the bank at Las Vegas.	If life is a game of chance, I am less personally responsible for my ultimate success or failure.
My old man is a grouch. He is from nowhere.	My father and I don't understand each other and cannot communicate. I can't model myself after him.
I like to get into a hopped up jalopie and go—go—go. Man, that really is living. Give me a bennie and watch me fly.	The excitement of speed and risk makes me feel competent. This is something I can do without sustained effort and it distracts me from my unpleasant self image.
Future? What future? The 'bomb' will take care of our future. If not, things will work out somehow.	To think of the future requires planning and effort. These are too painful since I have failed too often before. I prefer to ignore it and trust to luck, etc., to make things come out all right.
The only time I feel at home is with my buddies—when we go out searching for kicks, I feel like a person.	The only time my self image is bolstered is when I am with other fellows who feel as I do and who help me explain away my problems.

attitudes stem from? The family inter-relationships would be the next logical place to search for their genesis.

Family and social relationships

In studying the influence of the family upon the underachiever, investigators could be found who looked at demographic variables (such as birth order, mother's educational level, family income, etc.) while others searched for the key in the study of personality dynamics and social relationships.

McGillivray (1964) found 235 eighth grade pupils in Toronto Public Schools who scored over 130 IQ on a group test of learning capacity. These students were ranked on the basis of achievement on a series of Canadian achievement tests. The top 50 in this ranking were labeled high achievers and the bottom 50, low achievers. Comparisons were made between these two groups on the basis of a parent interview form designed to obtain the family background of the students.

No differences were found between the two groups on data such as size of family, birth order, number of broken homes, educational level of parents, family incomes, etc. However, the parents of high achievers showed more interest in education and in their children. The high achievers spend more time doing homework, also. The author concluded that while the physical environment was roughly the same for the two groups, the psychological environment at home was different and was the crucial variable in this instance.

Langan (1962) compared 60 New York high school gifted children (IQ 130-150) who were labeled achievers (HSA from 80-95) with a matched group of underachievers (HSA from 60-80). Both groups were evenly divided by sex. Five major dimensions were investigated—family, academic orientation, educational goals, parental behavior, and expressed problems.

The variables that reached statistical significance in favor of the achievers were:

1. Father had more education.
2. Enjoyed subject matter courses.
3. Family relationships were healthier.
4. More academic interests.
5. The underachievers tended to be more indulgent with regard to pleasurable activities and early gratification.

Many dimensions did not show differences. Among them were birth order, the educational level of the mother, goals, reading habits, parental educational objectives and social habits.

Some investigators abandoned the search for significant demographic variables and sought to probe the psychological relationships directly. Pierce (1959) studied the top 30 percent in intellectual ability of tenth- and twelfth-grade students enrolled in the Quincy, Illinois, public schools. These youngsters were divided into two groups. In one were placed the children achieving effectively; in the other, the youngsters whose grade point average was quite low in relationship to their ability. In comparing the 27 achievers with the 27 underachievers, some interesting differences were discovered in their family inter-relationships. More high achieving boys and girls felt that their fathers were important influences in their lives than did the low achievers. The underachiever more often named someone outside the immediate family, such as an uncle, a minister, or a teacher, as having been the most important influence in his life. This interesting result was also found by Kimball (1953), who discovered poor interrelationships between father and son in families of underachieving boys.

The mothers of high achieving boys scored significantly lower in authoritarianism in Pierce's research than did the mothers of low achieving boys. However, the exact opposite was true for the mothers of high achieving girls who were rated as more authoritarian than the mothers of low achieving girls. Thus, the boys seemed to thrive under the democratic or laissez-faire attitude, whereas the girls seem to produce more effectively under authoritarian and controlling attitudes.

Pierce (1961) conducted a follow-up study of his earlier research project which had noted sex differences on achievement motivation, and values between tenth- and twelfth-grade level achievers and underachievers. Since the earlier differences between grade levels might have been due to sampling differences, Pierce retested the available twelfth-grade students who had been in the tenth-grade sample in the earlier study. The fathers of these students were also administered the Parental Attitudes Research Instrument (PARI). The mothers had previously taken this questionnaire.

One of the puzzling results of the earlier study was that the high achieving girls showed lower achievement motivation than the low achieving girls. This result was *not* replicated in this study. The results were diametrically opposed to the earlier study showing the value of replicating research. A further breakdown of the data still showed that girls going to college had a much lower achievement motivation score than girls not going to college. There is a possibility that peculiarities of the test itself (for example, fantasy productions were asked from a story stimulus of male figures) may have something to do with these strange results and other instruments should be used to check out this result.

A result confirming the previous study findings appeared in the family attitudes. The fathers of high achieving boys scored lower on authoritarian attitudes but the fathers of high achieving girls were *higher* in authoritarian attitudes. The consistency of these results suggests that a family attitude of greater freedom is related to boys' high academic performance but strictness and high standards to girls' high achievement.

Drews and Teahan (1957) compared the mothers of 20 high achieving junior high school students with the mothers of 20 low achieving students on a scale designed to measure Dominance, Possessiveness and Ignoring. The mothers of the high achievers were revealed to be significantly higher in dominance and in *not* ignoring the child. Drews and Teahan interpret these results as supporting the notion that "parental intervention is necessary for the development of proper ego controls within the child so that he can adjust to the reality demands of the schoolroom."

Shaw (1964) compared parental attitudes toward independence training and academic achievement of 64 tenth-eleventh grade academic achievers and underachievers (CTMM IQ 110+; GPA 2.7-) on the Winterbottom Independence Training Inventory. The fathers of the underachieving boys were significantly more concerned with social autonomy and felt that their boys should stand up for their rights and demonstrate their masculinity. The mothers of achieving boys stressed the value of self-sufficiency.

The mothers of the underachieving girls stress that they should know their way around the town and city. In general, the underachievers were concerned with social independence and personal autonomy.

Morrow and Wilson (1961) investigated the nature of the peer relations of underachievers. The groups consisting of 49 high school boys each (Group IQ 120+) were differentiated on the basis of grade point average. They were administered a battery of self-report techniques designed to measure general personal adjustment and peer relations.

The underachieving boys described themselves as more impulsive, adventurous, and restless. However, no differences were obtained on personal morale or general self-confidence. Of particular interest was the fact that underachievers more often described their friends as showing a negative attitude to school-achievement and authority, and favored violation of adult laws and standards, excitement seeking, and dissatisfaction with life.

The authors pointed out that underachievers not only have differences in their personal characteristics *but* also seek out a peer group that tends to reinforce the more immature and irresponsible aspects of their personality. While remediation of underachievement has been limited to individual treatment, it is clear from these results that a closer look should be taken at the peer environment as a possible point where changes can be effected.

In general, high achievers seem to have a stronger identification with their parents who, in turn, require high standards of performance from their children. The asocial nature of the underachiever may well be nourished by his peer friends of like immaturity, creating a social problem on top of the personal adjustment difficulties.

Learning characteristics

The distinction between the "healthy" and "unhealthy" adult often rests, not on the amount of hostility or anxiety present but on how such impulses are expressed. It is in the ego control of impulses that attention has now been focused.

Shaw and Black (1960) chose 21 male achievers with an IQ of 113+ from a junior and senior high school population and matched them with 21 underachievers of like IQ and characteristics. Achievers were characterized by those students who had a grade point average of 2.0 or above on a 3.0 scale, while the underachievers were those who had a grade point average of 1.79 or below.

These matched pairs were administered the Cook Hostility Scale and the Rosenzweig Picture Frustration Test. The authors found that the underachievers did show significantly greater feelings of hostility. The analysis of the Rosenzweig yielded no differences in terms of direction of hostility or in type of reaction, but there was a significant difference in the underachievers denying responsibility for the offense which they had been charged. The authors concluded that the underachiever often believes that his environment is, to a large extent, responsible for what happens to him. He responds to his errors in a more defensive way than the achievers and thus is less likely to attempt to modify his own performance as a solution for his problems.

Davids and Sidman (1962) compared small samples of achievers and underachievers of high school age on a battery of experimental tasks relating to motor inhibition, time estimation, time orientation, and delay of gratification. The high achiever group consisted of ten boys with Wechsler IQ scores in the top 5 percent and were "outstanding successful students," while the underachieving group of twenty boys had a mean Wechsler IQ of 126 but were functioning far below their potential in school.

The investigators found that the high achieving boys were less impulsive, were able to inhibit their motor responses, and more future-oriented in their fantasy and imagination. These results confirmed what many other investigators have noted, that underachievers appear bound in the present and are unable to think or plan in terms of future goals. There seems sufficient evidence regarding these characteristics to consider their incorporation into a serious treatment program for underachievers.

Martin and Davidson (1964) compared ten achievers in a senior high school class in college preparatory English with nine underachievers on the recall of incomplete tasks. The criterion for the underachievers was that they would be above the median in IQ but below the median of the class in grade point average. When they were presented with a series of incomplete tasks, the achievers showed a greater tendency to recall the nature of the incomplete task than did the underachievers. Thus while the achievers showed the characteristic Zeigarnik effect, which finds learning increased if the subject is stopped before completing the task, the underachievers did not. These results may well reflect the central problem of differential motivation between the two groups.

While most of the studies on underachievement have concerned themselves with the personality characteristics of the underachiever, Perkins (1965) has studied the classroom behavior of underachievers. The initial sample was drawn from 27 fifth-grade classrooms in an upper-middle class suburban community in Maryland. The underachievers had an average IQ of 114 or above on a group test and a grade point average that fell one standard error of estimate below the regression line for his classroom. An achiever was considered a person whose grade point average fell within one standard error of the estimated regression line for that classroom. From this selection, an experimental group of 36 underachievers was matched on IQ, sex, and reading scores with 36 control groups achievers.

Two minute samples of the classroom behavior and learning activities of the experimental and control group students were categorized during weekly observation in one or more of four academic subjects; language arts, arithmetic, social studies and science. A two member observer team collected over 2,000 two-minute samples totaling over 80 hours over a period of five months. A complex classification system, covering both teacher and student behaviors, was applied to these two-minute samples.

The basic difference between achievers and underachievers vested in extracurricular work syndromes which characterizes the underachievers; that is, they spent more classroom time working in other than academic areas. Withdrawing was a particularly predominant symptom in arithmetic.

However, there were a number of areas in which expected differences between the groups were not found. The two groups spent about equal amounts of time listening and watching, reading and writing, being highly active and involved.

However, the achiever was engaged in significantly more social, work-oriented interaction with peers than underachievers. Substantial differences were obtained on classroom behavior between boys and girls as might be more expected. The boys showed more high activity, were more intent on work in other academic areas, and showed more withdrawal in language areas; while the girls were more social during arithmetic lessons.

These results confirm the poor study habits of the underachiever by direct observation. He does not appear ready to learn but rather ready to withdraw. His weak ego already on the defensive is ready for fight or flight, neither pattern an effective prelude to learning.

Department of Redundant Research

Another candidate for the Department of Redundant Research lies in the general comparison of a group of underachievers with a group of achievers in the area of self-concept, attitudes toward school, friendship choices, and personality characteristics such as persistence and study habits.

We know with considerable certainty what the results of such a comparison would be—the achievers will have a better self-concept, will like school more, will have more socially acceptable friends, will tend to choose more long-range goals, have higher aspiration levels, better study habits, etc., etc.

We have cataloged to an impressive degree these comparative results, but what still remains the most crucial questions are:

(1) what to do with the underachiever to improve his status?

(2) and which of these elements are the crucial elements in the development of the underachiever and which are only minor associated characteristics which might be expected to disappear upon remediation of the basic problem?

Talent from Culturally Different Groups

One of the major foci of the mid-1960's in American education has been the youngster who is culturally different. In many instances, the term socially or educationally disadvantaged is applied to these youngsters in this country. It must be admitted that, in terms of their potential educational achievement, such terms seem justified. A comprehensive survey of the literature on the role of the cultural difference and/or disadvantage as it influences the developing intellect of the child is beyond the scope of this particular review. Students wishing such a review are referred to Bloom, Davis and Hess (1964), Pettigrew (1964), and the December 1965 issue of the *Review of Educational Research*, which is entirely devoted to information on socially disadvantaged children.

We are concerned in this volume with the amount of talent that might be expected from such culturally different areas and how the characteristics of talented youngsters from *different cultures* might vary from the general pattern previously reported in the section on the high IQ youngster. A summary of current knowledge on available talent from culturally disadvantaged areas can be summed up as follows:

a. Few talented youngsters, on a percentage basis, are found in sub-groups of the culture coming from low socioeconomic groups.
b. Conversely, children from nationality and racial groups found in upper-middle class areas appear with a greater than expected frequency of intellectual talent.
c. Attempts to intervene with positive stimulation seems to result in some improvement in intellectual functioning in the culturally disadvantaged groups.
d. The range of intellectual ability remains impressive within even the most impoverished groups.

Since there has been general acceptance in the behavioral sciences of the role environment plays on the performance on IQ tests, it becomes important to locate factors which seem crucial to the emergence of talent, even under apparently unfavorable circumstances. Concern for the intellectual performance of minority cultural groups often takes the form of searching for mental incompetence rather than mental superiority. Such results are instructive, though, for whenever the rate of mental retardation goes up, the rate of giftedness in a sub-population tends to go down.

Ginzberg and Bray (1953) conducted a comprehensive survey of men rejected from military service on the grounds of mental deficiency. Approximately 5 percent of the white men applying for military service from the Southeast and Southwest were rejected on the grounds of mental deficiency. Only 1 percent of the whites from the West, Midwest and middle Atlantic states were rejected for the same reasons. When Negro men are included, the rejection rates of men fom the southeastern states becomes even more dramatic compard to other sections of the country.

While it might be tempting to assume some natural superiority for persons born in the Midwest (if you are from Illinois), the simplest explanation for this difference is that students from regions of high rejection have grown up in a cultural atmosphere and an educational system that are not conducive to the maximum development of intellectual ability. Can talent be found in children with different or disadvantaged circumstances? Jenkins (1948) reports on the case studies of 18 Negro youngsters who have been identified with Binet IQ scores of 160 and above. Five of the cases tested above 180 Binet IQ, and, since a score of this level is expected only once in a million times, it is clear to see that the Negro population has some representatives at the very highest level of intellectual development. The same results can be repeated for any minority group. At the same time, a study by Deutsch and Brown (1964) suggested that the intellectual status of Negro children in an urban area becomes progressively worse from grades one to five. These authors believe in a cumulative deficit hypothesis: the deprivation has greater influence on later developmental stages.

Rohrer (1942) reported on the intelligence scores of Indian tribes with particular reference to the Osage Indians in Oklahoma. While practically all Indian populations obtained lower average IQ scores than the white population, the Osage Indians have scores comparable with white children on both verbal and non-verbal tests of abliity. What is so different about the Osage Indians? These Indians were not typical of the usual poverty stricken culture by reason of the accident of oil discovered on their reservation. This enabled them to create for themselves a better educational environment than was possible for the usual Indian tribe. For the majority of the culturally different population, no oil strike can be depended on, and the cumulative deficit discussed by Deutsch and Brown progressively robs us of potential talent.

A Fair IQ Test?

One of the more confusing and fruitless searches available in the field of educational measurement has been the search for a culture-free intelligence test which would avoid the cultural biases of the usual IQ test. The latest efforts in this direction have been summarized by Karp and Sigel (1965). Most of these efforts have centered on trying to find tests on which students from disadvantaged circumstances or from lower social classes would do as well as their more advantaged colleagues. One can have compassion for this psychological sleight-of-hand attempt to bring fairness to an unfair world. The hard facts are that unfavorable environment and circumstances do not provide the linguistic development necessary for success in a complex culture whose very nature is built around verbal and linguistic systems. Such talent suppressed is not easily regained. The embarrassing question not easily handled by those interested in culture-free tests is, even if it were possible to construct such an instrument, what would we do with it once we had it? Surely such a test will not predict educational success when that success depends on the very verbal development that has been carefully excised from the test.

Goodenough and Morris (1950) reported on their attempt to discover a culture-free test, and their scientific soul searching over a decade ago bears repetition here.

> We would like to express the opinion that the search for a culture-free test, whether of intelligence, artistic ability, personal-social characteristics, or any other measurable trait is illusory, and that the naive assumption that the mere freedom from verbal requirements render a test equally suitable for all groups is no longer tenable. (1950, p. 399)

Cross Cultural Creativity

Some studies have begun to appear on cultural or racial comparisons using the new measure of creativity. Torrance (1962) embarked on the unique task of comparing children of various cultures on a series of non-verbal tests measuring originality. More than 1,000 pupils in grades one to six from each of six different cultures were examined. The tests were administered by native examiners and given in the native language of the subjects. These subjects were drawn from the United States, Australia, Western Samoa, Germany, India, and a sample of segregated Negro schools in Georgia. Originality scores were determined on the basis of statistical infrequency with the additional requirement that the response was relevant and a break from the obvious commonplace and banal.

From the combined scores on the three non-verbal tests, drawn from the Minnesota Tests of Creativity, Torrance derived differing developmental curves of originality from the six cultures. For example, in the United States population, there was a decrement in growth rate at grades four and five while German and Indian children showed a marked increase at this time. Torrance also cites other evidence to suggest that there are developmental discontinuities in our culture which present specific problems for the five-, nine-, thirteen- and seventeen-year old youngster. These problems are, in part, responsible for the decrease in the average performance on these measures of originality at these ages. Since Torrance gives no figures on IQ scores, or school achievement, or even the mean response total to the subcultures on the major tasks (only the mean weighted scores are presented), it is difficult to evaluate the meaningfulness of this provocative study.

Cultural Differences

Gowan and Torrance (1965) reported on an extension of the previous work on cultural differences in developing intelligence. A total of 1408 primary school children in the Singapore schools, grades two to six, were given measures of non-verbal ideational fluency. Their tasks were to complete, or make sketches from a stimulus of either jagged or parallel lines presented to them. The test performance was measured as the total number of sketches made in a set period of time. The tests were administered to children in their native language of Chinese, Malay, and Tamil, and comparisons were made across native language, ethnic group, grade level, and *stream* (the Singapore term for grouping according to academic aptitude or ability).

In almost all of these groups the same tendency for an average reduction in the fourth or fifth grade seems to be indicated. While this reduction in intellectual fluency has often been attributed to the reaction of the students to an inflexible curriculum which tends to inhibit originality and creativity, the authors in this instance have provided an alternative explanation which seems to have much merit. They suggested that such a diminution in fluency may merely represent the student's moving from one stage of development to another. as from Piaget's stage of concrete operations to the level of formal logic. In doing so, he is retooling his mind for the more complicated thought processes and thus does not produce as many answers to questions as he did before.

The authors also pointed out that the "A" stream, or the top achieving youngsters were significantly inferior (!) to the lower streams in ideational fluency. While the authors tend to interpret this as a result of the greater academic pressures that the "A" stream group are placed under, it could just as easily be interpreted that the "A" stream children have gone into a higher level of development and thus are not as free and easy with reckless and inferior answers as are the lower stream children. This is an eminently testable hypothesis which could be done by analyzing responses in terms of cognitive complexity as well as merely counting the total number of responses.

Iscoe and Pierce-Jones (1964) gave measures of verbal educational fluency and flexibility to 267 white and Negro school children (CA-5-9) in Austin, Texas. Although an attempt was made to equate racial groups by choosing only lower class white students, the white sample was still superior on socioeconomic factors to the Negro group.

On a measure of intellectual fluency, the Unusual Uses Test, the Negro group did better than the white group although no differences were found on *flexibility*, the number of categories named. No time limit was employed on this test, contrary to its use in other studies. On IQ tests the white group was significantly superior to the Negro.

The results of this study did not agree with Torrance's portrait of a developmental growth of divergent thinking curve with a dip at grade four. Such discrepancies call for further investigation.

Characteristics of Lower Class Gifted

Frierson (1964), in a rare study, investigated the difference in characteristics of gifted students who came from lower socioeconomic status to those from a more favorable environment. Two samples of average ability children (IQ 85-115) were also included in the comparison. All of the gifted students were enrolled in major work classes for gifted children in the metropolitan Cleveland area. Fifty-six students were found in the lower socioeconomic area and 88 in the upper socioeconomic area. Similar numbers were obtained for the average student groups.

These four samples were compared on a number of variables including physical growth, a children's personality questionnaire, the Minnesota Tests of Creative Thinking, and an interest inventory. In terms of physical growth, the advantaged gifted were slightly larger than the disadvantaged gifted, but the difference did not reach accepted levels of statistical significance. Neither were there physical differences between the gifted and average students.

No group differences were obtained on the personality measures either, although again a trend was found for the gifted advantaged to show superiority in superego development (greater conscience or self-discipline). In the area of activity preferences, significant differences were obtained between the advantaged and the disadvantaged gifted, with the advantaged preferring reading while the disadvantaged gifted preferred participation in games and competitive sports. The two gifted samples seemed to be more similar to one another in interests than they were to the average groups.

The disadvantaged gifted revealed differences from the disadvantaged average group, particularly in reading preferences, such as biographies and contemporary affairs. These received low ratings of interest in the average group. The disadvantaged gifted did not show as much interest in the traditional cowboy and Indian stories that the disadvantaged average groups were attracted to.

In reading a newspaper, the disadvantaged gifted read the front page and the editorials more often than the average ability youngsters and about the same as the upper strata of gifted. Finally, the advantaged gifted were superior to the disadvantaged gifted on measures of creative thinking. Smith (1965), in a study reported earlier, found similar results. Since these measures depended heavily on verbal facility, these trends represented no great surprise.

The author concluded that there were clear differences between advantaged and disadvantaged students in interests and attitudes. There were many similarities as well, particularly in the personality dimensions. What this study does seem to demonstrate conclusively is that a description of the characteristics of gifted students should include their socioeconomic levels and cultural backgrounds.

Values for Intellectual Growth

Even when socioeconomic status has been held constant, some cultural groups seem to produce more than their share of talented children, and these groups provide a good focus for study. The Jewish subculture has seemed to produce more than its share of gifted. Barbe (1956) and Hollingworth (1926) have noted the relatively high percentage of gifted Jewish students. It would seem valuable then to look more closely at the family environment for clues to this phenomenon.

One of the interesting findings in the extensive canvass of gifted children taken by Terman and his associates (1947) was the discovery that different cultural and racial backgrounds did produce different proportions of gifted children in their sample. For example, the Italian group produced fewer children with high IQ scores than would be expected on the basis of their total numbers in the population, while the Jewish population contributed considerably more gifted children than was expected.

Since the Jewish group did provide a fairly large ethnic subgroup in his study, Terman and his associates attempted to study the differences and similarities between the Jewish and non-Jewish children to see what differences might have appeared. The few differences that were obtained seemed less important than the large amount of similarity between the two groups. For example, there were no significant differences in the total IQ score of the Jewish and non-Jewish populations, and no differences in nervous symptoms or emotional adjustment as measured both by their self-ratings and their ratings by interviewers.

There were no differences in the scholastic records of the two groups in high school, although in college the Jewish men did seem to do a little better than the non-Jewish. There was a striking upward movement in occupational status in this generation of the Jewish population.

There was an interesting difference in marital adjustment, with the divorce rate among the Jewish subjects only one-third that of the non-Jewish group. In tests of marital happiness, there were no differences between Jewish and non-Jewish men, but Jewish women rated themselves as more happy than the women in non-Jewish families.

Another area of significant difference had to do with political philosophy and belief, with the Jewish subjects showing a significant trend toward supporting liberalism when compared with the rest of the population. Terman concluded that the "Jewish subjects in this group differ little from the non-Jewish except in their greater drive for vocational success, their somewhat greater tendency toward liberalism in political attitudes, and somewhat lower divorce rate."

The values which the family supports spring many times from the larger cultural background. Changes which we ascribed to family environment may refer, in reality, more to this cultural environment. Strodtbeck (1958) studied the background of 43 Italian and 79 Jewish families in an eastern city. He found marked differences in upward social movement of the two groups, with the Jewish families doubling the number of their members in the professional and upper middle class in one generation.

Study of the two different cultures revealed a number of factors in which they were different, and which might relate to school achievement. On a V-scale which measured family values, Strodtbeck found differences between the two groups in their responses to the following statements:

1. Planning only makes a person happy since your plans hardly ever work out anyway.
2. When a man is born, the success he is going to have is already in the cards, so he might as well accept it and not fight against it.

These items, which have to do with the ability to master one's own environment, were rejected more by the Jewish than by the Italian families. Other items which seemed to differentiate the groups were related to the Jewish tendency to show greater independence from the family unit in rejecting such statements as:

1. Even when teenagers get married their main loyalty still belongs to their fathers and mothers.
2. When the time comes for the boy to take a job he should stay near his parents even if it means giving up a good job opportunity.
3. Nothing in life is worth the sacrifices of moving away from your parents.

Strodtbeck contended that there are four or five general philosophies of life stemming from the culture which have influenced for high or low achievement. These are:

1. A belief that the world is orderly and amenable to rational mastery. Therefore, a person should make plans that will control his destiny.
2. A willingness to leave home to make one's way in life.
3. A preference for individual rather than collective credit for work done.
4. The belief that man could improve himself through education and that no one should readily submit to fate.
5. A greater equality of power between the mother and father in the family.

Strodtbeck concluded that the cultures which support these values will produce more achievers than will a culture which supports values antagonistic to them. Studies like these will eventually throw more light on the very difficult and puzzling problem of the genesis of values in family life.

CHAPTER 6

INTERVENTION

Up to this point in the volume, we have tried to assess what is known about the characteristics of various categories of gifted children. In the section that follows, the author has tried to present the various types of educational intervention and their influence on gifted children. From the relative size of the two major sections of this volume, it is clear that we have talked much more about what gifted children are like than about what to do with them in the educational setting. Nevertheless, the growth of material in this section on active intervention is most encouraging. The reader will note the large number of recent references, indicating marked acceleration of educational planning and programming for talented students.

For the convenience of the author and reader, the sections on the types of intervention have been labeled as follows:

I. *Administrative* — this means changing the educational world around the child. Some form of acceleration or grouping usually is the most common administrative modification.

II. *Instructional* — this means changing the content of the instructional matter or changing the style or manner in which the material was presented.

III. *Adjunctive* — this means providing special services above and beyond what is expected in the usual school program as, for example, counseling services for underachieving gifted children.

Research Design Problems

Much of the research which has attempted to evaluate the various forms of intervention has done so by comparing a group of gifted children within the special program with other groups of youngsters. There are special problems involved in such comparisons that the reader should be aware of. Many of the studies that are reviewed, or that the reader will come across in his own search, have substantial defects.

These defects are not always due to the research person, for he is sometimes forced to evaluate a world that he never made. Until recently, it was rare to find a researcher in a position to influence policy, yet certain policy decisions made as part of the program have great relevance to what kind of program evaluation can be made. It would be highly desirable for the schools that aspire to do research on their own program to consult with researchers before making administrative decisions, such as who is accepted in the program, what test shall be given to which children, and like decisions which sometimes seriously hobble or destroy research possibilities before the matter of evaluation can even be considered.

Listed below are some of the major problems found in the usual comparative research study in the literature.

1. It is not possible to demonstrate the effectiveness of a given program by showing that the gifted children in the special group will score two, three, or four grade levels above their own chronological age on achievement tests.

Reason: Gifted children in the regular program are already performing extremely well on achievement tests. This fact has been shown by Terman (1925), Witty (1930), Gallagher and Crowder (1957), and many others. Test results that favor the special group do not answer the question of what these youngsters might have done if they had been in the regular program. There is every reason to believe that they would be well above their own chronological age level in achievement whatever the program.

2. It is not possible to prove the effectiveness of a program for the gifted by giving achievement tests before the program begins and after it is completed.

Reason: This double administration could show, for example, that the gifted children in the special program have gained two or more years in reading during one school year. However, we know that in the regular program gifted children often gain in achievement well over the expected rate of growth of the normal child. Accelerated educational growth can happen in the special program but still the question remains as to whether these youngsters might not have done just as well if not, indeed, even better in the regular program.

3. We cannot demonstrate the effectiveness of a program for gifted children by obtaining the opinions of people connected with the programs, i.e., teachers, parents and children, when these opinions have not been supported by objective measures of some sort.

Reason: Subjective evaluations or opinions have been shown in many experiments in psychology to be subject to conscious or unconscious bias. As a simple example, many of the parents may be happy that the school system is providing a special program for their youngsters and will give a favorable evaluation in order to see the program continue. Teachers not previously aware of the special characteristics or virtues of these youngsters because they had been submerged in a classroom of 35 or 40 children now pay more special attention to them and notice those favorable characteristics which might have been present all along. They may misinterpret *their* own changed perceptions of the children to the advantage of the program.

Finally, there is the phenomenon called the "Hawthorne effect" in which there is the strong suggestion that people will react favorably to *any* program which is novel and evidences a greater interest in the parents and their children.

Another frequently used and dubious method of obtaining information about a program is the questionnaire approach. Questionnaires about programs almost invariably get a positive response partly because people—parents and others—don't wish to respond negatively when people of good faith are trying hard to do something. Secondly, the most disgruntled of the recipients of the questionnaire often do not answer it, so the answers that the researcher gets back are predominantly positive and favorable.

The central question, what the gifted youngsters would have done if they had *not* been in a special program, is one which points up the necessity of a *control group,* a group of youngsters presumably equal in important respects to the special group. The control group enables the investigator to evaluate what the special group might have done under ordinary circumstances.

4. The benefits of a special program for gifted children will not be demonstrated by comparing these gifted children with the rest of the children of their grade level.

Reason: Obviously, if one takes the brightest children in the group and puts them in the experimental group and keeps all the rest for "controls," then the achievement obtained by the special group may be due, not to the special educational program, but merely to the large difference in intelligence between the two groups to begin with.

5. It is not possible to demonstrate the benefits of a special program for gifted children by showing that children in the special group, even when matched for IQ, are superior if they have not been matched on other important factors also.

Reason: Level of intelligence, obviously, is not the only characteristic closely related to achievement; for example, another important factor is *motivation.* Most of the programs evaluated after the fact, that is, after the program is well in progress, will often be comparing gifted children of high motivation (for that is the reason they were placed in the special program in the first place) with gifted children who might be of the same intellectual ability but who have miscellaneous motivational or attitudinal or family problems which kept them from being selected for the special group. Obviously a comparison of the achievement of the two groups does not give us a clear picture upon which to base the evaluation of a special program. The difference between the two groups may merely reflect the difference in achievement that is related to good motivation vs. poor motivation.

6. A program for gifted children cannot be adequately evaluated if measuring instruments are not adequate or appropriate to measure the unique nature of the program.

Reason: The use of improper or inadequate measuring instruments could result in not giving full credit to the difference which the special program may have really brought about in the children. Most programs for gifted children put a high premium on the development of such characteristics as creativity, originality, ability to do critical thinking, and leadership. Unless the evaluation of change in the children includes measures of these characteristics, then the evaluation is inadequate.

Administering a standard achievement test before and after the program, even if the students have been selected with care, will not tell you what you want to know, since very little on a standard achievement test is related to the ability to be creative or to lead. Unfortunately, these characteristics are among the most difficult to measure. This fact, in turn, calls for someone with some knowledge and sophistication in the area of measurement to help plan the evaluation. School systems without staff members who can help in this area should seek adequate consultant help before embarking on such a program.

Effective Design for Comparative Group Research

The most commonly used research designs to solve the above stated problems is that of matched or randomly selected groups with one group receiving the special treatment while the other, presumably equal, group is receiving the regular program. To be truly equal, these groups must be matched or shown equivalent on all the variables that you believe might exert an untoward influence on the final results. Therefore, such factors as motivation and emotional stability will have to be matched, as well as intelligence and achievement. No comparison betwen highly motivated groups of children in special class programs and an unmotivated group of gifted children in the regular program can be of much use in evaluating the effectiveness of the special program.

These standards are hard to meet when the research director is asked to evaluate a program already in progress. The *experimental* group has already been determined; they are the children in the special program. Who is left for the *control* group? If gifted children are found in the regular class, then a pertinent question to be answered is, "Why aren't they in the special program?" If it is because they can't achieve on the level of the special group, or don't want to learn, or are emotionally disturbed, then they cannot be members of the control group. *Only those children who would be eligible on all important characteristics for the special group should be used in the control group.* This means that youngsters would be acceptable for control group membership although not able to attend the special program by reason of geography or other reasons not connected with ability or interest in the program.

Although the emphasis has been placed on comparing experimental and control groups, much fruitful analysis can be conducted *within* the treatment group itself. Why does one child respond to the program and another one fail to respond? What are the characteristics of those students who are not positively influenced by the special instruction? This internal analysis often can provide information that would lead to the strengthening of the program itself.

CHAPTER 7

ADMINISTRATIVE INTERVENTION

Enrichment

One of the program adjustments for gifted children which causes the least change in existing programs or scheduling has been to provide for *enrichment* in the regular classroom. Despite its common usage it is difficult to obtain a clear-cut definition of the term. Barbe and Norris (1954) collected a few of these definitions, such as:

> A regimen of informal and interest motivated activities.
> The deliberate differentiation of curriculum content and activities.
> The provision of more diversified materials and richer experiences for gifted pupils.

None of these give much specific guidance to the teacher who wishes to differentiate between enrichment and busy work. Sumption and Leucking (1960) defined enrichment as "the practice of providing additional kinds of learning experiences beyond those offered in the regular program." Such a definition comes closer to distinguishing between additional work and special work.

Gallagher (1964c) presented a definition which attempted to make the same type of differentiation. *Enrichment can be defined as the type of activity devoted to the further development of the particular intellectual skills and talents of the gifted child.*

These might be described as:

1. The ability to associate and interrelate concepts.
2. The ability to evaluate facts and arguments critically.
3. The ability to create new ideas and originate new lines of thought.
4. The ability to reason through complex problems.
5. The ability to understand other situations, other times, and other people, to be less bound by one's own peculiar environmental surroundings.

Research evidence for the efficacy of enrichment over a normal program is not widely available. Where it has been done, as in the following set of studies, more personnel are available than is usually the case in the ordinary system claiming to use this method.

As part of a comprehensive state plan in California, several attempts were made to evaluate the influence of enrichment programs on the academic and educational adjustment of gifted students within the regular classroom (Martinson, 1961). Two classes were evaluated at the intermediate level and one at the first grade level. In comparison with control groups, the enriched program students showed slight gains in achievement over comparable students.

It must be stated here that enrichment in this program represented a considerably greater expenditure of personnel than is usually considered when enrichment in the schools is discussed. In this instance, there was a consultant available who worked constantly with the teachers, both individually and in group sessions, to help them plan and provide curriculum experiences for their gifted children in the classes. The consultants also supplied books and other materials to expand and broaden the child's learning experiences.

One of the problems mentioned by the teachers participating in the project was the difficulty of providing the stimulation with the wide ability range. The pressure of time and multiple obligations was also mentioned frequently. These same problems were also brought up by the consultants who worked with the enrichment program.

Gallagher, Greenman, Karnes, and King (1960) reported an attempt to provide classroom enrichment for children of very high intellectual ability (Binet IQ 150+) within the framework of the regular elementary classroom in two midwestern school systems. A case study was executed on each of 54 children who qualified for the study. Extensive tests, parent interviews, teacher interviews, and measures of social and emotional adjustment were all used to determine individual problem areas and possible ways in which the school could deal with these problem areas.

Some examples of the types of individual planning were:

a. One child was moved to another school where he could receive more intellectual challenge and stimulation.
b. Three children were accelerated a grade after special planning with present and future teachers.
c. Classroom committee assignments and revised seating in the classroom were provided to some students with the view to improving social adjustment acceptance.
d. Children were in a few instances referred for special treatment for speech and emotional problems.
e. Special projects were given to some children in the area of their known interests in an attempt to stimulate greater motivation and interest in school.
f. Other special activities were suggested for some children who did not seem to show evidence of creative or original thinking. Such activities included completing unfinished poems and creating stories out of imaginative themes. (For example—What would have happened if Lincoln had not been assassinated? What would be the feelings of the first man to land on the moon? Suppose there were no more winters; what would happen?)

These investigators found little difference between the before and after expected achievement scores for either the total group or for those special children for whom academic recommendations were made. However, the teacher and parents both observed increased motivation and interests in the children who were included in the study.

A limited amount of available time and the lack of subject knowledge on the part of the classroom teachers were cited as some reasons for lack of academic improvement. The investigators concluded that the knowledge of the child's problem and intellectual potential must be supplemented by teacher know-how and mastery of content, and by auxiliary personnel who could help the teacher use this knowledge to greatest advantage.

Passow, Goldberg, and Link (1961) studied three different programs of enrichment at the junior high school level. Four groups of talented students were matched in IQ, average arithmetic performance, teacher ratings, and sex. One group was accelerated in content material, taking seventh and eighth grade arithmetic courses in one year. A second group took the UICSM program, a third group took the regular program with six enrichment units added, and the control group took the standard eighth grade course. Performance of the groups was measured on the Stanford Achievement Battery, the Davis Mathematical Competence, and Attitude Inventories toward Mathematics.

In general, the results suggested that the accelerated group was superior to the other three and that all three treatment groups were superior to the control sample. In addition, the accelerated group and the UICSM group showed significantly higher self-appraisal of their own mathematical abilities as well as their interest in mathematics as an area.

Thus, we have seen that the accelerated program did significantly improve the student's performance in mathematics. This result was obtained in several other instances and prompted a generalization that whenever ability grouping is accompanied by differentiated curriculum, favorable results can be obtained. When no such curriculum planning accompanies the ability grouping, little of a positive nature will be found in comparing the two groups of gifted students.

Ability Grouping

Some educational issues plague educators like a low-grade toothache. They come and go, but rarely have the staying power necessary to stimulate reform and remediation. Ability grouping is one of those issues. Despite a voluminous literature in educational research (see reviews by Miller and Otto, 1930; Turney, 1931; Whipple, 1936; Goodlad, 1960; Eckstrom, 1961; Goldberg and Passow, 1962; Franseth, 1963; and Shores, 1964), this issue is still being debated in educational circles. The debate seems partially due to ignorance of this literature, but it is also partially due to the fact that the results of past studies have been so varied that almost anyone can find support for his own views by choosing the research results supporting his position. Furthermore, although there is a great volume of research, much of it has fundamental defects and methodological weaknesses.

Passow (1962) has pointed out three of these major weaknesses. The first is the *sampling procedures*. In the available research, a specially chosen group of gifted students is often compared with another group which is not a legitimate control group. The second problem is the *measuring instruments*. Many of the past research projects accepted standardized tests of school achievement as the yardstick against which the effectiveness of the special program was evaluated.

Third, the *treatment variable,* or the unique nature of the special program in the ability grouped section, has often been either poorly described or not described at all.

The studies included in this section, therefore, do not represent the total literature in this field, but only those studies that attempted to look at identifiable programs for gifted students. Early examples of evaluations of special class programs for gifted children were relatively infrequent for the simple reason that you cannot evaluate a program that is not there. Therefore, most of the literature specifically relating to gifted children was limited to programs in Cleveland, New York, and later in Portland, Oregon.

Special Classes

Since the Cleveland Major Work Classes for Gifted Children were established in 1921-22, a number of attempts have been made to evaluate the strengths and weaknesses of this program in comparison with those of the regular educational system. Sumption (1941) compared, by means of a questionnaire, three groups of 65 children on a series of questions related to social relationships, self-expression, critical thinking, health, and other activities. These three groups were matched closely on sex, age, IQ, and nationality background. At the time the questionnaires were answered, the respondents ranged in age from about 18 to 30. One group had not participated at any time in the Major Work Classes, a second group had had up to three years of experience in the classes, and a third group had four to twelve years of experience in the Major Work Classes.

In comparing the results, Sumption found no important differences between the Major Work and non-Major Work students in physical or mental health, nor were there any differences found in the children's attitudes toward the home and family relationship. However, there *did* seem to be a major difference in the attitudes, values and recreational habits of the Major Work students as opposed to the non-Major Work students. The graduates of Major Work Classes participated in wider leisure time activities, had wider and more extensive reading activities, demonstrated more effective ability to take leadership roles, and had a wider range of self-expressive activities. Since one of the objectives of the Major Work program was to develop such self-expression, these favorable results seem to indicate that the program, in part, did what the planners had hoped it would do. However, this was just one study, and the opinions of these students were not cross-checked through teacher or parent rating or objective tests.

Barbe (1955) sent questionnaires to all of the graduates of the Major Work program for gifted children in Cleveland between the years 1938 and 1952. Of those who returned the questionnaire (77 percent of those contacted), 47 percent of the respondents approved of the program with enthusiasm and 37 percent approved with some reservation or hesitancy. Only 8 percent said that they disapproved of the program itself or strongly opposed it. This percentage might, of course, be considerably increased if one questioned more closely those who did not respond to the questionnaire. Perhaps more important are the opinions on what the most liked and least liked aspects of the program were. Table XII shows the responses of the boys and girls to the program itself.

The opportunity to express individuality was highly valued by both boys and girls as was the opportunity to take part in the enriched program. In addition, the boys liked the greater freedom from regimentation in the Major Work program while the girls valued highly the foreign language experience in the Major Work program. The boys, however, listed French as one of the least liked aspects of the program. The negative aspects of the program that were most often perceived were (1) the negative attitudes of other students and pupils toward them, and (2) the lack of social contact with other students. Barbe reports that there was a reduction in the percentage of response in this area from 1940 to 1950, which suggested that these aspects of the program have been improved.

Over half of the students responding suggested no changes at all. Those changes which were requested followed expected lines. The students would have liked more opportunity to mix with other students and also requested more effectively trained teachers. In addition, the boys asked for more acceleration. This is an interesting point since the respondents were now advanced in their educational career and more likely to see the long-rang benefits of such an administrative move.

TABLE XII. EVALUATION BY GRADUATES OF MAJOR WORK CLASSES—CLEVELAND
(after W. Barbe, 1955)

	Boys (N = 210)	Girls (N = 237)
Best liked aspects of program	1. Opportunity to express individuality.	1. Foreign language
	2. Enrichment procedures	2. Enrichment procedures
	3. Freedom from regimentation	3. Opportunity to express individuality.
Least liked aspects of program.	1. Attitudes of other students and teachers.	1. Lack of social contact with other pupils.
	2. Lack of social contact with other pupils.	2. Attitudes of other students and teachers.
	3. Foreign language.	3. Not enough attention to skill subjects.
Suggested changes	1. None.	1. None.
	2. More mixing with other pupils.	2. More mixing with other pupils.
	3. Better trained teachers.	3. Vocational guidance
	4. More acceleration.	4. Better trained teachers.

New York City has also been quite active in developing a special program for gifted children, and a number of attempts have been made to evaluate its effectiveness. Schwartz (1942) compared a group of 200 students who were enrolled in a special class program in the New York schools (grades one through eight) with a group of 200 control students who attended the regular program in the New York system. These experimental and control students were closely matched on IQ, age, sex, and socioeconomic status to eliminate the possibility of these factors biasing the results. The special class program had a special curriculum and, in addition, had special resource teachers of language, science, speech, fine arts, etc.

The entire group of children were given achievement and personality tests in February on one year and again in June of that same year. The two groups were compared on the amount of growth made during the elapsed period of time. The results indicated that the group in the special class program was significantly superior at every grade level and in every subject matter. The control group compiled a rather dismal academic record. They gained only a little over two months in achievement in the four months of elapsed time. This is an extremely poor result for any group of gifted children, in or out of the regular grades, and raises the suspicion that the children in the control sample in the regular grades were not well motivated or that they differed in some important personality characteristics with the group in the special class.

Evaluation of Secondary Programs

A combination of segregation and acceleration in the special progress classes in New York City was evaluated by Justman (1954). These classes were composed of children who had IQ scores of 130 or higher and showed superior academic achievement and such personal characteristics as initiative, enthusiasm, and capacity for sustained work. Justman compared 79 of these children from special progress junior high school classes with 79 children of equivalent mental ability matched closely for grade, sex, and age and compared their performance on a wide battery of achievement and attitude tests. In a comparison of the seventh and eighth grade students, the children from Special Progress classes were significantly higher in tests purporting to measure mathematical facts, concepts, and appreciation, but not significantly higher in skills. The Special Progress group performed better in all areas of the science subtests. However, there were no significant differences between the two groups in the area of social studies.

In the more nebulous area of originality and creativity, Justman obtained teacher ratings on poems and stories created by both groups. The teacher rated the Special Progress group higher in such characteristics as originality, characterization, feeling, tone, and style, but none of these differences were statistically significant. The Special Progress group also exceeded the control sample in map reading and indexing.

Justman concluded that "the segregation of intellectually gifted pupils in a special class is generally accompanied by academic achievement superior to that normally attained by equally gifted pupils who remain in normal progress groups" and goes on to say "it is clear that the segregation of intellectually gifted pupils in homogeneous special progress groups at the junior high school level has some value."

Although this study was conducted more carefully than most, there was no attempt to equate the groups on subject matter knowledge prior to their entrance into the Special Progress classes, and there is always the possibility that the Special Progress children had been significantly ahead of their comparison group before entering the program itself.

In the Portland, Oregon (1959) program for the gifted, attempts were made to evaluate the effects of special classes in pilot schools during the fifth to eighth grades. Thirty pupils who were in a homeroom enrichment program and attended special classes were matched with 30 children in the regular program on IQ, sex, achievement in the fourth grade, and socioeconomic level of school attended. Results indicated consistently superior performance by the pilot group in reading over a four-year period, but no significant differences were obtained in arithmetic. In no instance did the average performance of the *control* group exceed the average performance of the *pilot* group on either reading or arithmetic over a four-year period. A similar experiment was conducted by the fifth-grade class with much the same results: superiority in reading in the *pilot* group but not superiority in arithmetic. The pilot pupils also showed significantly higher scores on interpretation of reading materials in the natural sciences and interpretation of literary materials.

Questionnaires administered to these groups revealed that the pilot group took part in a greater number of school activities and had more hobbies and higher motivation for achievement. The report concluded,

> . . . elementary school pupils participating in the gifted child program have made and are continuing to make greater gains in intellectual achievement than comparable pupils not participating in the program. Second, the gifted child program apparently had no ill effects upon the general adjustment of the pupils participating.

Perhaps the most comprehensive study of the effects of ability grouping has been done by Goldberg, Passow, Justman, and Hage (1965). Within the New York City public schools, 86 fifth-grade classes in 45 elementary schools were arranged in various patterns of ability grouping and maintained their intact status for two years. Five ability levels were identified, using a third-grade group performance intelligence test. In this manner, a wide variation of broad-range and narrow-range ability groups were evaluated on the basis of achievement, self-attitudes, social acceptance of deviant children, and teacher ratings. The results of the study indicated no advantage for the narrow-range ability grouped highly talented children. In some instances, there seemed to be more gains made by the broad range groups. Few differences were obtained by ability groups on attitudes or interest measures as well. The authors concluded that merely changing the ability grouping within the class *without* changing the curriculum or the manner in which the children were taught cannot be expected to produce any substantial changes. As Goldberg (1965) has commented, "ability grouping is by no means a sufficient condition insuring greater academic achievement at any ability level. At best, it provides a framework within which enhanced learning may be more effectively planned and executed." (pg. 41)

Despite the careful experimental design, the ability grouping in the New York experimental study does not correspond with the usual ability grouping in other communities and cannot be directly applied. The grouping in New York was done solely on the basis of IQ scores, whereas practically all ability grouping programs now use a multiple selection criteria for admsision to a special class; that is, not only IQ scores are considered, but also reading scores, motivation, and other variables. In the New York study, even though the classes were labeled as narrow-range ability groups on IQ, they might show as much as a six-year range in reading ability at the fourth and fifth grade level. This would hardly classify as the ideal type of ability grouping for gifted students, as most school administrators would view it.

Another interesting aspect of the study, however, was finding that the gains in achievement were more related to specific classes than they were to ability levels. The investigator pointed out that teachers seemed to be more successful in handling several ability levels simultaneously within a single subject than they were in treating several subjects with equally satisfactory results even for one ability level. In other words, a teacher that was good in teaching science was good for all ability levels in science but not in other subject areas. These research results raise serious questions about the self-contained elementary classroom as an effective device in stimulating the abilities of either the bright or dull student.

Differences that may be obtained or not obtained in studies of ability grouping depend upon what characteristics are measured. This problem is illustrated in a study by Drews (1963), who made a comparison of 151 high ability ninth graders who were in special English classes which were designed to provide stimulation in thinking ability. A comparison of experimental and control groups revealed few differences on standardized achievement tests. If this had been the only measure used, the conclusion would have been that the experimental program had achieved no positive results. However on less standardized measures, differences between groups were obtained. It was found that the teacher talked less in the special classes, that the students in the special classes were observed to have better attitudes toward school and that there was less dominance in the class discussion by a few individual students.

Another study by Borg *et al.* (1964) needs to be commented on if only because of its size and ambition. Two entire school systems were compared, one that had homogeneous ability grouping and the other random or heterogeneous ability grouping. Over 4,000 students were studied over a period of four years in grades four and six to nine. Comparisons were made on achievement, study habits, social adjustments, personality change, and attitude toward school, and own adjustment. As might be expected, no clear differences were obtained favoring one school district over the other. In the 47 comparisons among superior ability groups, 14 were significantly in favor of the ability grouping and 3 of the random group, although most of the differences were obtained during the first year of the study.

A comparison of the high ability section found that in the homogeneous group program there was a significantly higher number of overachievers (and a lower number of underachievers) than in the random grouping program. So while average differences were not obtained, there did seem to be differences in those students at the extremes of the group. This study suffered from the faults of previous studies, however, in an inadequate description of the treatment variable. So it is not clear what differences in curriculum or teaching methods were used in the two systems.

One of the most frequent questions asked by both parents and educators has been about the influence of ability grouping on both social and emotional development of the gifted student. Byers (1961) reviewed the few studies available in this area and concluded that gifted students did not suffer socially or emotionally as a result of ability grouping. It must be noted, however, that these studies were limited by the research design factors noted above and have not completely settled the issue of the influence of different educational and social environments on the developing attitudes and values of students.

Much of the reluctance of parents to involve their children in special programs has been related, not to their concern about academic development, but rather on the possible negative influence on the attitudes and values of the students who participate in the program. They fear that the students may become snobbish or may have an inflated ego, or that the singling out of these students for special attention may generate hostility towards them from average or below-average students. What evidence that is available shows that such fears are not well grounded. For example, a study by Passow and Goldberg (1962) indicated that when bright students were moved from broad- to narrow-ability range groups, their self-estimate tended to go down. Instead of fostering snobbery and conceit, membership in the special class tended to "take the gifted student down a peg" (see study by Gallagher, 1965b, in State Project Section for similar findings).

Special Schools

Though the vast majority of children at the secondary level attend comprehensive high schools, there is available in larger communities a different kind of high school which has particular importance for the education of gifted children, a school which has been established to train children in specific content areas. An outstanding example of this kind of school may be found in New York City, where the High School of Music and Art, the High School of Performing Arts, the High School of Science, and others offer special opportunities and training for able children with specific interests and motivations.

A modification of this special school program may be seen in the "school-within-a-school" program, as found in Forest Hills High School in New York City. There the children are grouped according to curriculum interests within a larger high school unit, but maintain a certain amount of group integrity and purpose. Meister (1958) suggests that "if the school population exceeds 1,000 and 80 percent or more of the students are college bound, many of the curriculum and organizational devices so advantageous in the special school become feasible." Entrance into the special school is not automatic but depends upon manifestations of high scholastic aptitude and, in some cases, personal interviews.

Some of the advantages of such a school as the High School of Science in New York would be having available a more highly trained and specialized staff, better laboratory facilities, etc. The curriculum offered in the biological sciences at the Bronx High School of Science is a basic course with a year in clinical laboratory techniques. Each science course is liberally provided with laboratory work. The completely equipped laboratories of the school provide every facility for various types of individual and group projects and make possible experiments connected with both class work and hobbies. In mathematics, a four-year sequence is available, including courses in algebra, geometry, intermediate algebra, trigonometry, and solid geometry.

In 1952 a questionnaire to graduates of the High School of Science revealed that nearly 80 percent of them had obtained work in scientific areas, while 20 percent had become business men, lawyers, writers, etc. In a large community the establishment of specialized schools of this type offers many advantages not contained in the comprehensive high school for intellectually able children.

The Conant report

Under the sponsorship of the Carnegie Foundation, James B. Conant, former president of Harvard University and Ambassador to Germany, undertook a survey of 55 high schools in 18 states that represented the American comprehensive high school. Conant's recommendations were derived from the personal visits and discussions with students, staff members, and administrators. The recommendations involved modifications of existing programs rather than elimination or drastic reorganization of existing programs. The one exception to this general rule was his recommendation to eliminate the small high schools, those with graduating classes of 100 or less. He believed it impossible to provide a comprehensive program, especially for the academically talented, with this small number of children where the classes would become abnormally small and the total cost per student extremely great. His one general criticism of the comprehensive high school was of particular concern to this publication.

> The academically talented student, as a rule, is not being sufficiently challenged and does not work hard enough, and his program of academic subjects is not of sufficient range. The able boys often specialize in mathematics and science to the exclusion of foreign languages and to the neglect of English and social studies. The able girls, on the other hand, too often avoid mathematics and science as well as the foreign languages.

Many, if not most, of the recommendations in the Conant report have already been implemented, despite much controversy. We can review the more important ones related to academically talented and gifted students.

1. Ability Grouping[4]

In the required subjects and those elected by students with a wide range of ability, the students should be grouped according to ability, subject by subject. For example, in English, American history, ninth grade algebra, biology, and physical science, there should be at least three types of classes—one for the more able in the subject, another for the large group whose ability is about average, and another for the very slow readers, who would be handled by special teachers.

For the purpose of developing an understanding among students of different levels of academic ability and vocational goals, homerooms should be organized as significant social units in the school. To this end students should be kept together in one homeroom for the entire senior high school course, and care should be taken to have the home room a cross-section of the school in ability and vocational interest.

2. Academically Talented

For the academically talented, four years of mathematics, four years of one foreign language, and three years of science, in addition to the required four years of English and three years of social studies—a total of 18 courses with homework to be taken in four years. This program will require at least 15 hours of homework each week.

For the highly gifted students some type of special arrangement should be made. If they are too few in numbers in some schools to warrant giving them instructions in a special class . . . a special guidance officer should be assigned to the group as a tutor and should keep in close touch with these students throughout their four years of senior high school work. The tutor should see to it that the students are challenged not only by their course work but by the development of their special interests as well.

3. English

Time devoted to English composition during the four years should occupy about half the total time devoted to the study of English. Each student should be required to write an average of one theme a week. Heavy emphasis should be placed on English composition.

4. Foreign Languages

School boards should be ready to offer a third and fourth year of foreign language no matter how few students enroll. The guidance officer should urge completion of a four-year sequence of one foreign language if the student demonstrates ability in handling languages.

5. Science

All students should obtain some understanding of the nature of science and the scientific approach by a required course in the physical sciences or biology. This course should be given in at least three sections grouped by ability.

6. Social Studies

In twelfth grade a course in American problems or American government should be required. Each class in this course should be a cross-section of the school, be a heterogeneous group. Teachers should encourage all students to participate in discussions. The course should develop not only an understanding of the American form of government and the economic basis of our free society, but also mutual respect and understanding among different types of students.

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[4] After J. B. Conant. The American High School Today. New York: McGraw-Hill. 1959.

7. Counseling

There should be one full-time counselor or guidance officer for every 250 to 300 pupils in the high school. These counselors should have had experience as teachers but should be engaged virtually full-time to counseling; they should be familiar with the use of tests and measurements of the aptitude and achievement of pupils.

By school policy every student should have an individualized program; there should be no classification of students according to clearly defined or labeled programs or tracks such as "college preparatory," "vocational," or "commercial." In advising the student toward an elective program, the counselor should be guided by the minimum program recommendations for the academically talented.

8. Grading

At the end of each marking period, a list should be published of the students who have elected courses recommended for the academically talented and have made an average grade of B. On graduation, a notation might be made on the diplomas of students who were on the academic honors list for all four years.

9. Acceleration

If enough students are available to provide a special class, these students should take in the twelfth grade one or more courses as a part of the advanced placement program. Under the program, a student in the twelfth grade may take such courses as college mathematics, college English, or college history and, after passing suitable examinations may be given college credit for the courses and also sophomore standing in these subjects.

Rural Seminars

One of Conant's strongest recommendations was for the abolition of high schools, found mainly in rural areas, which have graduating classes of less than 100. There is little doubt that the problems of the gifted child in a small rural high school with limited faculty and limited numbers of students of similar ability are severe. One attempt to handle such a situation was reported by Morris (1957). In a rural area of New York State, the district superintendent and principals of six schools launched an experimental program for talented youth. As Morris describes it, "Once each week on alternate Tuesdays and Thursdays pupils from grades 11 and 12 are brought together by cars and station wagons for an afternoon of experience designed especially for them and called the Youth Seminar."

The resources for this group were not large. They had to meet in a room that was not planned for such a situation but was available, and they had to conduct the program without laboratory or other specialized equipment. The faculty consisted of those people who were available and interested. For this particular group it was a "homemaking teacher, guidance counselor, and county director of pupil personnel services, who served as chairman of the group. Other teachers served in an advisory capacity." The purpose of the program was to provide the students with opportunities to integrate knowledge, clarify and deepen concepts, and develop appreciations. These aims were attained by giving pupils the opportunity to ask questions and to follow through on answering them without concern for grade or credit. The range of questions asked by the members of this seminar is adequate evidence of the need of rural youth to have the same enrichment advantages as those provided by more organized urban communities.

Some of the questions asked were:

> "What makes people respond to art?"
> "Why are beliefs right for some but not important for others?"
> "How does God communicate with man?"
> "How is knowledge obtained?"
> "What is the difference between aesthetic appreciation and knowledge?"
> "How are values established?"

The discussions were carried on in an informal seminar. Presentations were made, the common element in the situation being an experience shared by all the youngsters, such as a particular book, movie, or musical composition. The students were generally enthusiastic about the program. One student commented that "it made me think more deeply on subjects I didn't think were important. In regular class the answer is right or wrong but in the seminar you examine what everyone says, and we had the opportunity to develop our thoughts orally without fear of criticism."

Morris concluded that talented rural high school youth have serious questions to ask but have not had adequate opportunity to ask or answer them. For example, the faculty learned that discussion of such topics as "What is the good and what is the evil?" were highly appreciated by the pupils. They also felt the need of more opportunity to discuss human relations and problems of family life. This is one example of how attempts can be made to improve the educational programming for talented youth even under less than favorable conditions.

Acceleration

The use of the administrative device of acceleration has been practiced sporadically with gifted children for many years. The plan dates back at least to 1867 when William Harris, Superintendent of Schools in St. Louis, introduced a flexible promotion system whereby gifted children could proceed at their own rate of development through the grades. One of the purposes of accelerating a bright youngster has been to get him into a more competitive situation with children at his own level.

TABLE XIII. THE AVERAGE AGE AT WHICH CHILDREN FINISH STAGES OF EDUCATION IN PREPARATION FOR A MEDICAL CAREER

SCHOOL PROGRAM	USUAL AGE AT COMPLETION
Elementary	12
Junior High	15
Senior High	18
College	22
Medical School	26
Internship	27
Residency	29

Another major advantage of accelerating children, however, is to shorten the total time that they spend in the educational program. As training programs for various professional and technical specialties become longer and longer, the length of the program itself becomes a social problem. As one can see from Table XIII, the child in the regular educational stream finishes senior high school at 18 and college by the time he is 22. If he goes on to a professional school, such as medical school, he is usually finished by age 26. Then some additional professional training is usually called for, in terms of an internship or residency, which means that this individual will not be prepared to actually take a productive part in society until about the age of 30. This, of course, takes no account of such other contingencies as military service or the necessity for earning a living. Can such a lengthy preparation for a career be shortened without seriously injuring the individual involved? That is the important question for parents and for society.

One other important argument for the use of acceleration as a technique has been presented by Lehman (1953). In his historical study of creative discoveries related to age, he came to the conclusion that most creative work is done before the age of 35, and many important discoveries have been made before the age of 30. Lehman's findings must be considered against the spectre of the ever lengthening training programs. It would be a serious problem, indeed, if we found that the period of maximum creativity was spent in school rather than in actual productive work.

Pressey (1955) investigated the reason for the abundance of notable and precocious musicians in Europe a century or so ago, together with a similar preponderence of precocious athletes in this country in recent years. He found that these general areas were of major contemporary popular acclaim. A close study of the careers of these prodigies suggested that the following factors were important in their development:

1. Precocious musicians and athletes usually had excellent early opportunities for the ability to develop, and encouragement from family and friends.
2. Usually individuals who developed precocious excellence had superior early and continuing individual guidance and instruction.

3. Precocious individuals had the opportunity frequently and continuously to practice and extend their special ability and to progress as they were able.
4. The special precocious ability usually brought a close association with others in the field, which greatly fostered the abilities of all concerned and led to a still wider stimulating acquaintance.
5. As a result of many opportunities for real accomplishment within his possibilities but of increasing challenge, the precocious musician or athlete had the stimulation of many and increasingly strong success experiences, and his world acclaimed these successes.

Pressey contended that mass education and lack of differentiation in the program for the gifted child have led to the result that "there is almost none of the individualized guidance and instruction for excellence that was mentioned as an important element in the rapid development of precocity in music and athletics."

Methods of Acceleration

Most citizens think first of grade-skipping when they think of acceleration, but actually the modes of acceleration are quite varied and occur at any point in the school career. Table XIV shows a variety of methods of acceleration for the gifted children.

TABLE XIV. VARIOUS METHODS OF ACCELERATION FOR GIFTED CHILDREN

TIME IN SCHOOL SEQUENCE	TYPE OF ACCELERATION MOST FREQUENTLY USED
Primary	Early admittance to school Ungraded primary
Intermediate	Ungraded classes Grade-skipping
Junior High	Telescoping three years into two Taking senior high classes for credit (calculus, literature, etc.)
Senior High	Extra load—early graduation Advanced placement Early admittance to college
College	Honors classes Credit by examination

At the primary level, the most common method is *early admittance to school*. In communities where the admittance standard is based on a rigid chronological age standard, exceptions can be made for bright youngsters who show both mental and emotional maturity.

The *ungraded primary* program, where gifted children may complete the first three grades in less time, gives the opportunity for acceleration without leaving the group.

At the intermediate level, *double promotion,* or *grade skipping,* seems to be the one procedure most often used. For it to work effectively, such a double promotion has to be carefully planned well in advance of the actual move so that the student misses nothing in the way of vital content through his advance.

At the junior high school level, it is not uncommon to find provisions whereby the program is telescoped from three to two years. Thus, the gifted children would be able to enter senior high school a year earlier. Bright youngsters in many high schools are allowed to take ninth grade classes such as algebra in the seventh or eighth grades and thus have part of their senior high program out of the way by the time they enter senior high.

One program of acceleration that has received increased attention and educational favor over the past few years has been the *advanced placement* program, which allows high school students to take advanced courses that may lead to college credit. The content of the courses is agreed upon by subject committees composed of high school and college representatives, and both the program and the evaluation aspects are coordinated by the College Entrance Examination Board.

Another distinguishing feature of the program is that the examinations which evaluate the students are primarily essay questions graded by groups of readers who make a judgment as to the level at which the students should begin their college study in a given content field. Although the number of institutions that originally participated has increased over a five-year period (1955 to 1960) from 12 colleges and universities to 400, and the number of students involved increased tenfold over the same period of time, the number of gifted students participating still represents a very small percentage of the total.[5]

Evaluation—Early Admission

In most of the studies involving the admission of under-age children to first grade, the early admittance children have been compared to those children who entered school at the regular time. Since the underage children were, as a rule, markedly above average in ability, the comparison was between a group of bright and average youngsters. The discovered superiority in the accelerated group cannot necessarily therefore be attributed to the process of acceleration alone. What can be examined closely, however, is whether early admittance to school has negatively affected the children in any social, emotional, or academic manner.

In 1939, the State of Nebraska passed a law to the effect that no child may enter first grade unless he is six years of age on October 15 or has completed kindergarten. However, a school may admit to kindergarten a child who is younger than the stipulated age if he shows readiness as determined by criteria established by the State Department of Public Instruction. This provision opened the way for a series of studies supervised by Worcester (1955) on the various aspects of the effect of early admittance to school. All these studies indicated that children entering school at an earlier age were *not* deficient in reading, social status, or emotional adjustment. Kazienko (1954) studied children in the fourth grade who had started at five years of age or younger and found that the mental age score was more influential in determining fourth grade achievement than was either chronological age or intelligence quotient. Worcester commented on this finding, "This, in itself, *should* be enough to do away with the rigid chronological age requirement for school entrance."

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[5] *New Dimensions in Higher Education,* No. 8. Washington, D. D.: U. S. Dept. of Health, Education and Welfare, 1961, pp. 2-11.

Mueller (1955) studied over 4,000 pupils in the cities of Grand Island and Hastings, Nebraska, and found that on the basis of teachers' ratings the younger but brighter group was significantly higher than those of the regular class in achievement, health, coordination, acceptance by others, leadership, attitude towards schools, and emotional adjustment. Similar results have been found in the earlier studies by Hobson (1948), who reports the successful use of early admittance procedures in the Brookline, Massachusetts schools and in a further study by Birch (1954) who reports on the favorable use of this technique in the first grade of the Pittsburgh schools.

A recent effort to evaluate early admission policy has been reported by Birch, Barney and Tisdall (1964). Nineteen children at ages 3.8 to 4.8 were placed in six neighborhood kindergartens. These children all had IQ scores of 130 and over on the Stanford Binet, and were one year advanced of their age group on the Vineland Social Maturity Scale. Of the 257 children listed in the census for the age group in this Pennsylvania community, 229 children were tested. The schools committee recommended that 26 of these be accepted into the program, and 19 parents approved their children participating in the advanced program.

When the children's adjustment to school was evaluated, they seemed to be reading at an appropriate level and making a good emotional judgment, with the exception of one child who came from a broken and unstable home. Sociometric ratings indicated that they were average or above average in selection as companions by the other students.

One of the more interesting results of the study was the change in attitude of the elementary school teachers involved. They showed a significant swing in favor of the program. Even where this policy has continued, as it has in this community, the number of children participating represents a very small percentage of the age group and a rather grudging bow to the concept of developmental differences. An excellent review of the early admissions programs and results has been presented by Reynolds. (1962).

Another variation on the theme of acceleration is reported by Rusch and Clark (1963). Instead of moving a student more rapidly through established curriculum, the summer is used to extend the school program. In a New York state community a group of 28 able children went to school for eleven months a year. They were grouped homogeneously for three academic years and four summer sessions.

At the end of this time, they were advanced to the ninth grade—one year in advance of their expected placement on the basis of chronological age. No differences were found between the accelerated group and a matched but non-accelerated control group in school adjustment or sociometric choice, but the experimental group was one full year ahead of the control group by standard achievement measures!

Another study which utilized the summer session as a mode for acceleration was presented by Klausmeier (1963). He reported on a group of ten boys and ten girls who had been accelerated from the second to the fourth grade following a five-week summer session. These youngsters were observed at the end of the fifth grade and showed no unfavorable academic, social, emotional, or physical correlates when related to a number of control samples of non-accelerated average and bright students.

Justman (1954) has presented the following generalizations based upon the slight evidence available on the effects of acceleration at the junior high school level:

1. Able pupils can complete the academic work of the junior high school in two rather than three years without loss.
2. Junior high school accelerants suffered no academic ill affects areas in their subsequent high school careers.
3. The personal and social adjustment of the accelerated pupil is generally equivalent to that of the normal progress peer during the junior high school period.
4. The social adjustment of junior high school accelerants proves to be similar to that of non-accelerants when the two groups are followed into high school.

A follow-up study by Mirman (1962) examined the adjustment patterns of 64 high school seniors (IQ 120+) who had been accelerated and matched with a sample who had made their normal chronological progress through school. Neither parental reports, school records, or psychological tests revealed significant differences in social adjustment. Both the parent and student reports were strongly positive in favor of the acceleration itself.

Although extensive formal evaluations of the *advanced placement* programs have not been made, the rapid growth and acceptance of this program is in itself an indication of the positive reaction of school administrators and of the lack of strong negative elements in the program. Few programs that contain manifestly harmful elements to the students survive very long, nor do they dramatically increase.

An extensive and long-range study of the effects of early admittance to college of gifted students was done with support from the Fund for the Advancement of Education (1957). The experiences of 1,350 early admission "scholars" in 12 participating colleges and universities were followed over a period of five years. These early admission "scholars" were matched on ability with a "comparison" group who entered the colleges at the same time but who had not been accelerated. The overall judgment of the scholars themselves was that the early admission was profitable to them in about 90 percent of the cases, and over 50 percent of them believed that the *early admission* concept should definitely be a regular part of the policy of American colleges.

A comparison of their academic records shows that the early admittance scholars achieved as well as and, in some cases, slightly better than their comparison group. One problem noticed by both the scholars and the professional people in judging their performance was that some initial personal and social adjustment problems were created by such early admittance. The group of scholars admitted in 1952 seemed to adjust better than the scholars admitted in 1951. This suggested that the adjustment difficulties of the scholars at the beginning of the program were not inherent in the program itself and were corrected as a result of the first year's experience.

An evaluation of this total group was made by Farnsworth (1957), who concluded that the scholars adjusted to campus life as well as the comparison students and their classmates. The reasons for the failures that did occur among the scholars were the same as for college students in general. However, the Farnsworth evaluation recommended that students should not be accepted unless they complete the eleventh grade, and that they should have emotional maturity consistent with their ability and be free from excessive parental pressure.

Two colleges, Goucher and Louisville, asked parents to give their impression of the program. In the Goucher survey, 26 out of 27 parents said they would send their daughters to college early again if they had the chance, and, in the Louisville survey, 11 of the 12 responding parents expressed approval of the early admission program.

Results of the program, on balance, suggest that the advantages have far outweighed the disadvantages. As one of the scholars wrote in his essays, "What is really needed . . . is a more effective high school system, but until the answer to this comes, colleges should provide some sort of escape hatch for the students who are ready to handle advanced work." These results are quite consistent with a series of research studies, reported by Pressey (1949), investigating acceleration during World War II.

Follow-up Studies

One of the offshoots of the longitudinal Terman research (reported above, pp. 21-23) was a study of the relative adjustment in adulthood made by high IQ children who had been accelerated (graduated from high school before CA of 16-6) with nonaccelerated students. Among other findings they reported that

a. The accelerants were more often in the highest rating for occupational success.

b. The accelerants showed no difference in marriage or divorce rate or scores on marital aptitude.

c. The overall data on physical and mental health favored the accelerants. (Terman and Oden, 1947)

Although Terman and his associates recognized that these favorable characteristics could have been partially responsible for the students' being accelerated, these data at least debunked the notion that acceleration leads to substantial social maladjustment. They concluded that acceleration of one year is desirable for those students going on for advanced academic work.

Adler, Pass, and Wright (1963) presented further evidence for the non-detrimental aspects of acceleration in a follow-up study of 431 subjects who had been in an accelerated program in which the students completed the work of grades 9 through 13 in a four-year period in a Canadian school. These students were matched with a control sample of 431 students for age and IQ. On the basis of tests and questionnaires, no general differences between experimental and control groups were found; there were suggestions that the experimental group was superior on some dimensions. They concluded that the students who continued through the program can be expected to do as well as or better than some of the students who had taken a year longer in the same course of study at the high school level.

Summary

The recent research on acceleration has done nothing to change the generally favorable portrait of these methods of moderately shortening the educational career of talented youth. The advantage of saving a year or two from a long investment in educational time does not seem to be diluted by social or emotional difficulties. The continued resistance to these procedures may stem either from opposing cultural values that are not too apparent or from the problem of operational feasibility in which research results have to be shown to work through demonstration in particular school systems. In this process of dissemination of ideas, demonstration centers such as the one at Urbana, Illinois, which attempts to demonstrate a program of acceleration for gifted students at all grade levels, as part of the total demonstration program for the state of Illinois, may aid in showing administrators and policy makers how such procedures can be made operationally feasible in a public school system.

Department of Redundant Research

The mere comparison of the accelerated with the non-accelerated talented students now seems, on the basis of evidence collected, to be a relatively useless study with foregone conclusions. We can expect that any such study, whether at the kindergarten or the college level, will reveal that the accelerants are at least equal to non-accelerated students, and in some departments can be measurably better. What still remain to be determined are the characteristics of youngsters that have been accelerated and have not done well, or perhaps the extension of acceleration as a concept to a larger group of intellectually superior but not highly gifted students who might also conceivably profit from the shortening of a long educational career.

Another interesting study from the standpoint of social psychology and community relations is that the attitudes of public and school personnel to acceleration, to see if the roots of generally irrational attitudes towards these procedures can be identified. When negative attitudes still persist in the face of strong contrary evidence, some more pervasive emotional factor would seem to be present and needs to be identified if these procedures are to be put into operation in our public schools.

CHAPTER 8

INSTRUCTIONAL INTERVENTION

Curriculum Intervention

The preceding chapter, which dealt with administrative change, has made quite clear the limitations of changing only the structure of the program without the basic content and instructional methods being modified. As was stated in a report by the Southern Regional Education Board on a national survey of programs for the gifted,

> Ability grouping makes possible many teaching and learning experiences which cannot be accomplished in the typical classroom. This can be seen again and again in specially composed classes in all parts of the country. (1962, p. 73)

But what is this new program, what is the something extra that has to be added following administrative modification in order to produce meaningful results? Three rather different attempts can be identified: enrichment in the framework of the regular group, an attempt to accelerate content rather than individuals, and, finally, a change in the content to be learned itself.

Certain trends that have affected education in our society in general can be identified as playing an important role in our changed attitude toward gifted students. One of these is the knowledge explosion itself. A tremendous increase in new knowledge each year makes a mockery of the attempts to give breadth of coverage in the content area. So in place of a curriculum that gives a wide breadth of coverage, at a rather superficial conceptual level, the alternative strategy is to plan the program so that the students will learn the basic structure or the most important ideas of the curriculum (Bruner, 1960).

The New Curricula

The rather expensive alphabet soup brewed by the National Science Foundation, PSSC, SMSG, CHEM, CBA, BSCS, etc. have expended tens of millions of dollars in their attempts to upgrade curriculum in their own subject areas.

Although these projects vary in their initiation and administration, the goals and objectives have remained remarkably similar; they wish to:

1. Present to the student the basic structure of the discipline.
2. Encourage students to explore and discover these key ideas by a teaching strategy which has the student emulate the professional, i.e. carry out experiments, learn the use of the tools of the trade (measuring instruments), etc.

3. Teach these major ideas to students as young as possible—hence, set theory at grade one, algebra in intermediate grades, etc.
4. Prepare the student for an intellectually complex world where knowledge rather than social competence is the predominant value.

There have been some general attempts in the social sciences to emulate these developments in the physical sciences and mathematics. Senesh (1960) has evolved an extended program in economics in which he stresses the "basic contours" or core concepts which return again and again in a grade one to twelve program. Some of the key economic concepts are:

1. All people and all nations are confronted with the conflict between their unlimited wants and limited resources. The degree of the conflict may vary, but conflict is always present.
2. From the beginning, men have tried new ways and means to lessen the gap betwen unlimited wants and limited resources. Their efforts to invent new machines and improve production processes are evidences of the desire to produce more, better, and faster.
3. In all countries the basic questions to be answered are what goods and services will be produced; how much of these will be produced; how will they be produced—that is, with more men or more machines or more raw materials; and who will receive the goods and services?
4. In the United States what and how much will be produced, how it will be produced, and for whom are largely determined by the free choice of the American people, either as consumers or participants in the production process.
5. Through their political process the American people sometimes limit their individual free choices in order to increase the general welfare.

Table XV gives the names and addresses of some of the more active projects in this area.

TABLE XV. SOME EXAMPLES OF THE NEW CURRICULUM PROJECTS

Mathematics

University of Illinois Committee on School Mathematics
1208 West Springfield
Urbana, Illinois

School Mathematics Study Group
Stanford University
Stanford, California

University of Maryland Mathematics Project
College of Education
College Park, Maryland

Experimental Project in the Teaching of Elementary-School Mathematics
Stanford University
Stanford, California

University of Illinois Arithmetic Project
University of Illinois
Urbana, Illinois

The Greater Cleveland Mathematics Program
Education Research Council of Greater Cleveland
75 Public Square
Cleveland, Ohio

The Syracuse University-Webster College Madison Project
The Madison Project
Syracuse, New York

Geometry Project of the Department of Mathematics of Stanford University
Stanford University
Stanford, California

Science

The Science Curriculum: K-12 Approach
National Science Teachers Association
1201 16th Street, N. W.
Washington, D. C.

Science Curriculum Program of the Science Manpower Project
Teachers College
Columbia University
New York, New York

The Elementary Science Study
Educational Services Inc.
164 Main Street
Watertown, Massachusetts

Elementary-School Science

Elementary-School Science Project
University of Illinois
805 West Pennsylvania Avenue
Urbana, Illinois

Elementary-School Science Project
University of California
Berkeley, California

Science—A Process Approach
American Association for the Advancement of Science
1515 Massachusetts Avenue, N. W.
Washington, D. C.

Physics

Physical Science Study Committee
Educational Services Inc.
164 Main Street
Watertown, Massachusetts

Biology

Biological Sciences Curriculum Study
University of Colorado
Boulder, Colorado

Chemistry

Chemical Bond Approach Project
Earlham College
Richmond, Indiana

Chemical Education Materials
University of California
Berkeley, California

Social Studies

Project Social Studies
Cooperative Research Program
Office of Education
U. S. Department of Health, Education and Welfare
Washington, D. C.

Greater Cleveland Social Science Program
Educational Research Council of Greater Cleveland
Rockefeller Building
Cleveland, Ohio

Elkhart Indiana Experiment in Economic Education
Department of Economics
Purdue University
West Lafayette, Indiana

High-School Geography Project
1785 Massachusetts Avenue, N. W.
Washington, D. C.

Anthropology Curriculum Study Project
5632 Kimbark Avenue
Chicago, Illinois

English

Project English
Cooperative Research Program
Office of Education
U. S. Department of Health, Education and Welfare
Washington, D. C.

Commission on English
687 Boylston Street
Boston, Massachusetts

Foreign Languages

A-LM Audio-Lingual Materials: French, German, Italian, Russian, Spanish
Modern Language Materials Development Center
2 West 20th Street
New York, New York

Foreign Language Program of the Modern Language Association of America
70 Fifth Avenue
New York, New York

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[6] Taken from J. I. Goodlad, *School Curriculum Reform in the United States.* New York: Fund for the Advancement of Education, 1964, pp. 94-95.

In the development of a multimillion-dollar operation such as a curriculum project like the Biological Sciences Curriculum Study, it is recognized that *evaluation* is a continuing and an inevitable part of the developmental process. The field testing of trial materials, the feedback obtained from teachers in the field, the judgments which are made by content specialists as to the internal consistency of the content, all represent important aspects of curriculum evaluation. In this report, however, we will concern ourselves exclusively with the comparative studies which relate this program to alternative programs for gifted and talented children.

The reader will note the pitifully small amount of information available on evaluation compared to the total funds expended. Even granting the difficulties involved, there seems to be a tendency in some of the projects to consider their own virtues so self-evident that they are in no need of verification—a proposition these scientists would certainly reject if found elsewhere in their own content field. Few of them so far have seriously addressed themselves to the proposition that Walbesser (1966) so cogently presents:

> What do we want the learner to be able to do after instruction that he was unable to do before instruction?

Wallace (1962) and Grobman (1962) reported on extensive comparative analysis of the performance of over 24,000 students taking the Biological Sciences Curriculum Study with almost 4,000 taking traditional programs. The results indicated that, on the BSCS constructed examination, the students taking the BSCS materials were superior to the control sample. However, the control sample was superior to the BSCS students on the Cooperative Biology Test which measures more standard curriculum materials.

These results again indicate how difficult it is to compare curricula that have different goals and thus produce different examinations constructed to evaluate these goals. Another finding was that superior ninth grade students could easily master the BSCS materials at the level of the average tenth grader. The boys consistently outscored girls on the BSCS biology tests and also on the conventional tests.

The authors concluded that high intelligence was an important factor in the mastery of these concepts and that conversely low intelligence was a negative indicator for taking these materials as then constructed. A new set of materials designed especially for slow learning students has since been produced partly as a result of the above data collection.

There appears to be some tentative evidence that more conceptually complex curriculum programs may be responded to differently by various ability levels of students. For example, there is a suggestion in some initial studies that it is the talented students who profit the most and can absorb the most from the new curriculum programs. Suppes and Binford (1964) attempted an experimental program of teaching mathematical logic to twelve fifth grade classes composed of 350 students. A number of sixth grade classes were added to the project during the next year. Suppes found that the upper quartile of elementary school students were able to achieve conceptual and technical mastery of elementary mathematical logic. This level of mastery approached 85 to 95 percent of that accomplished by the ordinary university student.

Lowman (1961) reported a comparison of two first-year algebra ninth grade classes, one using Oklahoma state adopted text and the other using UICSM material stressing the discovery method. Pre- and posttest scores for each group were made on the basis of comparing basic mathematics concepts. A statistically significant difference was obtained in favor of the group using the UICSM materials for students in the upper third of intellectual ability, but no differences were found in the middle third or lower third. These results suggest that different levels of intellectual ability respond differently to the imposition of the new and conceptually complex curriculum. Much further research needs to be done to determine the nature of the relationship between IQ and the mastery of the new curriculum.

Tatsuoka and Easley (1963) conducted a large-scale evaluation of the impact of the UICSM (University of Illinois Committee on School Mathematics) on a large sample of experimental and control samples. A total of over 1,700 students in 38 different schools using the UICSM were compared with 676 control subjects in 26 ninth grade classes. These samples were not matched but were chosen by historical accident in the sense that the experimental group came from schools which volunteered to use the UICSM materials. Initial differences in performance were obtained when numerical reasoning and verbal ability scores on the DAT were statistically equated by use of the analysis of covariance. In general, the experimental sample showed significant gains to the control sample even though the instrument being used, the Cooperative Algebra Test, had been developed over more traditional concepts.

One of the most extensive attempts to evaluate a new curriculum has been presented by Passow, Goldberg, and Link (1961). In this study, four seventh grade high-ability math sections were formed. The first section was a curriculum acceleration section. It moved through the mathematics program as rapidly as possible, taking all the available algebra that the students could master by the end of the ninth grade. Two of the three remaining groups were labeled "enriched," one receiving the Illinois Math Program (UICSM) while the second enriched group took additional units dealing with sets, typology, statistics, etc., in addition to the usual program. The control group merely followed the program that had been used with gifted students during the three years of the experiment.

Significant differences were obtained on both mathematical content and attitudes toward mathematics. On all measures, the curriculum accelerated group scored the highest. The UICSM group was also significantly higher than the control group, with the general enriched group following in third place in achievement level. The investigators concluded that it was possible to introduce more difficult content and increase the tempo of instruction for junior high students and that this process, in turn, would result in greater mathematical competence. One interesting aspect of the study was that it also resulted in more positive attitudes toward mathematics than were obtained by following the standard curriculum.

Alpert, Stellwagon, and Becker (1962) reported on the influence of the School Mathematics Study Group program. In addition to mathematics achievement, they also measured attitudes to mathematics self-concept and anxiety. Comparing a carefully selected seventh grade population of SMSG and non-SMSG populations, they found no differences in positive attitudes to mathematics between the groups. They did find that the *combination* of a theoretically orientated teacher and a theoretically orientated program (SMSG) did have an influence in increasing positive attitudes to mathematics.

Numerous sex differences were also found, notably that the boys' self-concept was more closely related to school performance than the girls'. (Remember this is seventh grade, and girls are becoming interested in other things.) These results again suggest that the impact of a new progam depends upon student readiness and motivation and that its influence lies in a complex interaction among all of these factors and the nature of the program itself.

New Curricula and Ability Grouping

The introduction of conceptually complex material in the various sciences and mathematics curricula and in some social studies curricula, has made almost academic the question of whether students should be grouped by ability. The introduction of conceptually complex material makes ability grouping almost mandatory, since so much of the current learning in those classes depends upon mastery of previous concepts. It is as simple as saying that students cannot take complex algebra before they have had the more basic algebra courses. Attempts to put students who have mastered the basic algebra courses with those who are still having trouble with arithmetic skills cannot lead to an effective learning situation.

Virtually the only way a wide range of ability can be tolerated in the classroom is to teach conceptually simple materials. In this way the bright student can learn more facts and the dull student can learn fewer facts, but they concentrate on a relatively simple level of understanding of the subject area. When the goal of the class, however, is the understanding in more depth of important abstract ideas, then the need to group students by ability and past achievement becomes manifest.

Other Content Changes

Drews (1965) has reported on a unique training program at the junior high school level, attempting to enhance the self-actualization of intellectually superior children. The subjects in the experiment were 198 ninth graders who were randomly assigned to four junior high school teachers each in a different school. The average IQ of the experimental and control groups was 123 and 122 respectively on the California Mental Maturity Test. All of these ninth grade students had a twelfth-grade average reading level and had similar family backgrounds.

The training program itself was an ambitious and attractive attempt to have the student view more of the social world around him and think about himself and his own role in this world. The experimental group saw and discussed a total of ten films, eight of which were presented with adult role models who were creative and scholarly and expressed deep social concern. Among these eight were an artist, singer, philosopher, historian, judge, anthropologist, etc.

The students developed a loose-leaf notebook around what was called the Four Worlds, the *natural* (which explored man's place in the physical universe), the *aesthetic* (which described the means by which man has transcended his mere physical existence), the *technological* (which discussed the adaptation of technology to human beings) and the *human* (which discussed the action and social interaction of people).

The following represents a series of propositions which underlie the program:

a. Each student must develop a identity (find himself and and find meaning in life—discover a place for himself in the world).
   He must see this process of "becoming" (self-actualization) as a central purpose of education.
b. Each student must take responsibility for his own education, his own acts, and his own statements.
c. Each student should come to view education as a continual and integral part of living.
d. Each student must see education, knowledge and himself as "open systems."

Both experimental and control groups were tested on a variety of instruments such as the Omnibus Personality Inventory, the Alport-Vernon-Lindzey Scale of Values, the Rokeach Scale of Dogmatism, and a series of scales developed especially for this experiment. At the posttest level distinct sex differences in the reaction to the program were noted. No differences in the Omnibus Personality Inventory were noted for boys. For the girls, the experimental group improved considerably in the areas of aestheticism, theoretical orientation, and thinking introversion. On the Alport-Vernon-Lindzey Scale of Values the boys showed a significant increase in the theoretical dimension while the girls showed a significant interest in the area of aesthetic development. Although no differences were found in the scale on dogmatism and rigidity, a significant gain for both experimental boys and girls was indicated on the Critical Thinking Test. More informal measures in the area of occupational choice and attitude toward self and toward the role of women in our society showed similar differences in a predictable direction.

One of the important aspects of the present study is the priority of the investigator's activities. Many people think that the evaluation study involves the selecting of the proper test and the presentation of these tests in an acceptable research design. This investigator saw that the first order of business was to establish a meaningful and distinctive training program. Under such a program, evaluation instruments then stand some chance of obtaining significant results. The acid test for such a curriculum study is whether it can be applied outside of the direction and aid of the principal investigator.

One of the distinctive aspects of this study is that the four teachers involved in this experimental group continually met with the principal investigator on matter of instruction, content, etc. In this respect, this study, as all of the new curriculum studies, poses a challenging and difficult problem. Few persons doubt the efficacy of the program if the originator of the program is directly involved in the training. It is when these results are dispensed over large numbers of teachers who had nothing to do with the original development of the materials that doubts arise concerning the degree to which the ideas and practices can be transferred.

One of the most difficult problems to meet for talented students lies in schools in rural areas, areas often so sparsely settled that it is physically impossible to group gifted students for instruction as one would do in an urban center. At the same time, the lack of supplementary facilities such as laboratories, the shortage of teachers with special knowledge areas, and less money to attract competent personnel mark the rural environment as a place needing special help.

One attempt to deal with this problem has been presented by Devitt (1961). He reports on the use of television to enhance intellectual stimulation of gifted pupils in small secondary schools in the state of Maine. During the school years of 1959 and 1960, four courses, two each in mathematics and the sciences, were presented in a program known as the "Nine O'Clock Scholar Program." Each of these television programs was transmitted for 30 minutes daily, Monday through Friday, for a total of 175 days, and each course carried one Carnegie credit toward graduation.

These courses were available officially in grades 10 to 12 for students with an IQ of 120 or above who had superior reading ability. These criteria were later changed to enroll those pupils in the top 10 percent of their classes. A total of 40 percent of the public schools within the range of a television transmitter participated within the first year and 33 percent during the second year. A somewhat smaller number of private schools participated also.

Four different treatment conditions were introduced in the experiment:

a. Television only.
b. Saturday seminars to discuss the concepts presented on television.
c. A visit from an assistant teacher who would help the pupils answer questions about what had been going on and perhaps do some supplementary teaching.
d. A combination of the seminars and the visits.

Performance on both the project-made tests and the standard tests of content progress in science and mathematics revealed that the students had learned a substantial number of concepts through the course. These objective test findings were supported by comments by the students after they had been in college for a year and from college personnel. The students who took the television course alone performed almost as well on evaluation measures as did those who had experienced other conditions; however, the supplementary service seemed to be more useful as emotional rather than academic support.

Despite a wide assortment of engineering problems, such as programming the students so that they could see the television course without its interfering with their other school work and the development of competent and interesting lessons presented through television, there did seem to be a potential revealed in this study for the use of television. That improvement was needed in programming was evident, since the students themselves felt that the televised course was more difficult and less understandable than a regular course and generally held the television courses in less esteem. Devitt observed finally that the following conditions were necessary for the maximum success of such an operation:

1. High quality courses through a competent teacher with sufficient assistance and equipment.
2. Provisions for the televised course to replace one of the student's regular classes, rather than being added onto a full program.
3. Adjustment of the school's schedule to eliminate conflict between the time of the telecast and the student's regular class.
4. A cooperative attitude on the part of local school personnel toward these televised courses.
5. Assignment of school personnel to produce television lessons.

Pedagogy

One of the encouraging research trends in the past half decade has been to study gifted students in the classroom and to be concerned with teacher strategies that could enhance student skills in productive thinking.

Gallagher (1965a) tape recorded five consecutive class sessions in each of twelve classes, which included 176 high achieving academically talented students at the junior and senior high school level. The mean verbal IQ for the groups ranged from 127 to 134; the mean nonverbal IQ, from 123 to 134. Each classroom session was analyzed by the Aschner-Gallagher classification system built on Guilford's structure of intellect. In addition, the students took a number of Guilford-type tests and other measures of attitude and self-concept. An extensive questionnaire was given to the family of the students, and this was placed in the total analysis.

The results of the study indicated that all of the teachers used a predominance of Cognitive Memory questions. The second most frequently used category was Convergent Thinking with smaller proportions in the Divergent and Evaluative Thinking areas. It was possible to find entire class sessions without either of the latter two categories represented. With very limited exceptions, students displayed the type of cognitive expression asked of them by the teacher, and this behavior, in turn, suggested that the teacher was a crucial factor in determining the type and amount of cognitive operations present in classroom discussion.

Gallagher also found differences in the degree of classroom expressiveness of gifted boys and girls, boys tending to be more expressive across all measurable classroom dimensions. The gifted girls expressed a more positive attitude toward the world around them than the boys but had less confidence in their own abilities. Teacher performance in the cognitive dimensions varied significantly from one day to another, and sometimes from one class section to another—even while teaching identical concepts.

In comparing gifted students who were expressive in class with those who were not, differences appeared to exist primarily in attitude and personality rather than in the cognitive realm. Feelings of dependence and autonomy apparently had more to do with cognitive expressiveness than did the slight differences in mental ability in the selected sample.

Sears (1963) differentiated children of high and average intellectual ability (100 girls and 95 boys in seven fifth and sixth grade classrooms in an upper-middle class suburban community) on school-associated variables. The purpose of the study was to relate various classroom conditions to target variables of significant outcomes of elementary education such as self-concept, liking for other children, task-oriented classroom behavior, achievement test scores, attitudes toward school activities and creativity test scores. Classroom conditions consisted of teachers' classroom behavior, their attitudes toward school activities and their perception of the child. The total group was divided by sex and mental ability with a group mean IQ of 115 on the PMA Test the dividing line on ability. Correlations were run between the six classes of child target variables and predictor variables for the four ability groups.

Several significant differences were obtained between the superior and average ability groups. Children with superior mental ability had more positive self-concepts and more positive attitudes toward school and possessed the ability to think in more original and creative ways. With children of average ability, the self-concept was highly dependent on favorable opinions from significant others in the classroom. Good performance of the superior boys and girls on divergent thinking and creative tests was related to good self-esteem and academic productivity. This relationship between divergent thinking and creative tests was related to good self-esteem and academic productivity. This relationship between divergent thinking and academic productivity was not true of the boys with average ability.

Significant differences were obtained also on the basis of sex. The data suggested that independence and task oriented work was seen by the teachers and peers as a legitimate means of striving for bright boys but somehow inappropriate or undesirable for bright girls of this age. In general, there were more substantial correlations between teacher behavior and the six target variables for children of superior mental ability than for average ability, a pattern suggesting that the superior students were more influenced by teacher variance than were the average youngsters. Most provocative of the findings was the suggestion that different kinds of classroom environments might be differentially rewarding for bright and average students. The bright student seemed more independent of his school environment for self-esteem, gaining rewards from his superior performance; the average student was dependent on opinions of teachers and peers for self-esteem.

Intervention-Pedagogy

One of the past postures of educators in the presence of gifted children was one of passive admiration and amazement. It was as if finding the jewel was enough; the polishing and cutting of the jewel was to be done by accident or intuition. The flexibility of intelligence and cognitive style reported in previous sections has increased the responsibility of the educator. He is now expected to participate in the talent development of the individual by intervening intelligently with appropriate experiences which allow the individual to develop his other talent to the maximum.

Mackworth (1965) gives a useful differentiation between two styles he calls *problem finding* and *problem solving*. He points out that:

> . . . problem solving is a choice between existing programs or sets of mental rules—whereas problem finding is the detection of the need for a new program based on a choice between existing and expected future programs. (p. 57)

The development of a computer-based society sharply decreases the need for, or the value of, the problem solver since problem solving can be done much more efficiently by the machines than by humans. The need for the problem finder is greater than ever. The differences between the two styles may be seen in Table XVI.

In considering these distinctions, it is worthwhile to consider how thoroughly the educational system has been bent upon the development of *problem solvers* rather than *problem finders*. Even our most talented students spend a greater part of their educational lives learning the solutions of earlier men; or they learn how to solve problems that were presented to them by other persons.

It is heartrending to watch intellectually mature students, who have confidently handled the traditional assignments, stumble bewilderedly when asked to seek out important problems for themselves. It is the goal of intervention in this area to provide the means by which students can be happier, and the educational climate to be more acceptable, for the problem finder.

This program is not without its cost to present educational operation. The problem finder is often an intellectual troublemaker in his rejection of present ideas, his tolerance of disorder while seeking order, and disarray and confusion he can cause in the process of seeking a target rather than obediently attempting to hit the target set up by the instructor. Long after we have reached a conclusion as to whether or not we can modify the educational environment to

TABLE XVI. PROBLEM SOLVING AND PROBLEM FINDING BY HUMANS

(after Mackworth, 1965)

	PROBLEM SOLVING	PROBLEM FINDING
Definition	Problem solving is the selection and use of an existing program for an existing set of programs.	Problem finding is the detection of the need for a new program by comparing existing and expected future programs.
Objective	To *choose correctly between existing programs*—in order to select the one program that effectively elicits the required actions from a set of possible responses.	To *choose correctly between existing and expected future programs*—in order to devise new programs and to realize that one or more of these would be more suitable than any of the existing programs in eliciting the required actions.
Method	Experiment more than thought minimizes the mismatch between the desired and apparent actual states.	Thought more than experiment minimizes the mismatch between the desired and apparent actual states.
Outcome	Success is the discovery of one specific acceptable answer to one well-defined problem.	Success is the discovery of many general questions from many ill-defined problems.

stimulate greater development of problem finders, we must decide if it is worthwhile to do so.

One question of instructional importance is whether the teacher, by modifying her presentation of problems, can change effectively the creative or productive thinking abilities of the students. Torrance (1965) has reported on a series of studies measuring the productivity of students under different conditions of instruction. One study began with the random selection of four sixth grade classes in one school into two experimental groups. In the first instance, they were asked to write the best story. In this condition, the students were told that the stories would be judged on correctness of spelling, punctuation, grammar, and sentence structure and that the important thing was to avoid making errors.

In this second experimental condition, the students were told that the stories would be judged on the basis of how interesting, exciting, and original they were. In comparing the 50 students who performed under condition A and the 53 students who performed under condition B, one found the results as expected, that the students that were told the important thing was to avoid punctuation and grammatical errors made much fewer errors than did the students who were told that the important thing was originality or creativity. On the other hand, the students who received the instructions to be unique and original significantly surpassed the other group on those dimensions.

In a similar study, Torrance divided a high achieving class of sixth grade pupils into two groups with one being asked to give as many ideas as possible on how to improve a stuffed toy dog. The other group was asked to think of as many clever, unusual or original ideas as they could. Again the results were as might be expected, that the students performed as they were instructed. The implications of these studies seem reasonably clear. If the students are told explicitly that the rewards that the teacher has to give out, mostly in terms of grades, are based upon neatness or conformity rather than originality, then that is the style of performance that the student is going to adopt. Whether such training sessions pay off in long-range changes in the student is another most important question and is as yet unanswered.[7]

Torrance (1965) carried out two studies which investigated the impact of the introduction of creativity exercises and teacher characteristics on the creative performance of the students in the class. In the first experiment he divided a group of 17 teachers into high creative and low creative on the basis of the different types of creative language activities that they reported. The eight teachers in the "high creative" group had a total of 188 pupils in their classes, and nine teachers in the "low creative" group had 234 pupils. A pretest and posttest design was administered on a set of imaginative stories told by the students. The only difference favoring students in the classrooms with the high creative teachers was on the number of words produced in the imaginative stories. No differences were found on composite creativity, originality, or interest scores.

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[7] A longstanding debate on this type of experiment may be followed in such NCTE publications as *English Journal, College English* and *Elmentary English.*

The second experiment, therefore, involved more intervention on the part of the experimenter in an attempt to produce a difference. A group of exercises were combined into a teacher's guide entitled "An Experimental Training Program in Creative Thinking." These were presented in the classrooms in which Form A of the Imaginative Stories Test was administered. In a six-week period, the teacher tried out at least ten of the twenty exercises given in the teacher's guide; after that six-week period, Form B of the Imaginative Stories Test was administered. In comparing originality scores on pretest and posttest, the results showed the students performed with a slight decrease (!) in originality over the period of time, a result which caused Torrance to comment that "exercises alone do not guarantee creative growth."

Davis and others (1960) reported on an experimental study designed to stimulate the specific intellectual abilities of a small group of gifted children. Twenty-six children who attended the first grade in Hunter College Elementary School were chosen from among 263 applicants. The experimental class was made up of those who scored in the top 7 percent of one of the five scales that composed the Hunter Aptitude Scale for Gifted Children. These five scales cover the areas of space, number, reasoning, science, and vocabulary. To compare the effects of instruction in a special area, each child received four times as many training sessions in his special area of giftedness as in the other four areas.

At the end of the first grade, the experimental group was tested and compared with the "control" group, which it exceeded in mean IQ by an average of 22 points! Differences consistently favored the experimental class. As a result of special instruction in a particular aptitude area, the training groups advanced significantly in that special area more than did the rest of the experimental class on the Primary Mental Abilities test. The results of this study seem important in suggesting that intellectual abilities can be differentiated even at this early age, contrary to what was previously believed.

Torrance and Myers (1962) have presented a series of lessons by which they explicitly taught elementary students a variety of social science research methods. The goal was to give students some experience in ways to organize experiences and gain some practice in handling data. A number of different research methodologies were presented, including *historical* (students were asked to plot information they could obtain from records and witnesses on "How they grew"), *descriptive* (students were asked to devise questions to get information they didn't know about a given picture), and *experimental* (students were given a task to produce under two different sets of instructions, and the results were analyzed to see if different instructions changed student behavior).

Such exercises provide an instructional goal of teaching students skills as well as content, thus preparing the students to be active and independent learners who know how to obtain information for themselves rather than seeking the "word of authority." The exercises also focus student attention on such crucial matters as the reliability of evidence, the problems of measurement, and other concepts needed to evaluate, and adjust to, the scientific world into which they were born.

Suchman (1961, 1962) has initiated one of the most thoroughly developed systems in pedagogy intervention with his inquiry training program. He used films illustrating scientific principles (such as the bimetallic strip experiment) and asked children to inquire into the reasons for the physical phenomena they observed by asking questions that the experimenter could answer "yes" or "no." He found children remarkably unprepared to inquire. Since the gifted student would be expected to be the seeker-after knowledge, his inability to ask good questions was disconcerting. Suchman therefore devised a training program which allowed the students to pursue the answer through (a) establishing the properties of the object or system in the experiment, (b) finding which objects or systems are necessary to the solution to the problem, and (c) discovery why such objects or systems are necessary to the solution to the problem.

In a comparison of twelve sixth grade classes receiving inquiry training and twelve classes having traditional didactic treatment some gains were noted for the inquiry group (members were able to ask more questions), but general content mastery remained about the same for both groups.

Scott and Sigal (1965) attempted to find whether specific inquiry training had a significant impact on an individual in the field of science concepts, creativity, or cognitive style. Three hundred children in grades four, five, and six from Detroit public schools were taught a series of science concepts. Half of this sample, at each grade level were taught using inquiry methods following the approach developed by Suchman, and the other half were taught the same concepts by conventional methods. At the end of the school year, all subjects were given a science concept achievement test, a creativity task, and a cognitive style task. The students who received the inquiry training showed superiority in grade five of science concept achievement but not at other grade levels, and no differences were found on divergent (creative) thinking tests. In styles of categorization, children who experienced the inquiry method were less inclined to categorize pictures of familiar objects on the basis of use or function; instead, they tended to classify familiar items on the basis of inferred attributes.

The inquiry strategy seemed to encourage girls to attend to detail from grade to grade and to increase their ability to draw inferences regarding attributes. Boys, however, showed greater variability over the three-year span in attention to details and the use of classifying labels.

The study illustrated, as do others, how many different variables may influence students to react differently to a particular treatment program. (See also Carlson, 1963; Cartledge and Krauser, 1963; Karnes, Wollersheim and Stanley, 1963.)

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There is enough evidence now available regarding the ability to change temporarily the style of attack a student may use in problem solving so that further demonstration of this point does not seem very useful. If we tell the student that we are going to watch carefully his use of descriptive adjectives in writing a theme, we can predict that his use of such adjectives will increase, at least for that particular assignment. What is not particularly clear and does need investigation is what pattern of experiences is necessary to permanently modify a student's characteristic approach to a task.

In other words, can the student transfer the experiences he has had regarding the use of descriptive adjectives or geometric theorems or originality exercises to his other work, academic or otherwise. If this cannot be demonstrated, are such exercises of any value?

To phrase it in the same context as the curriculum section:

> What particular behavior do we expect the student
> to perform *after* training that he could not perform
> prior to the instruction?

CHAPTER 9

ADJUNCTIVE INTERVENTION

Underachievement

In the previous section on the characteristics of underachieving talented students, we found that there often was a set of personality characteristics which led to a low self-concept, which led to avoidance of academic situations or challenges, which leads to academic failure. The failure in many cases lies in not living up to the individual's potential rather than absolute failure in course work in school.

Two major strategies can be noted in the attempt to do something about the problem. One is to focus on the poor self-concept of the underachievers and attempt, through counseling, to help these students to perceive themselves in a more accurate light and thus break the vicious circle of low self-concept ⟶ poor academic performance ⟶ low self-concept. The second major strategy is to adjust the school program and curriculum in an attempt to meet more effectively the needs of these youngsters through direct educational programming.

Counseling

The introduction of large numbers of counselors into the secondary program following World War II, added to the already discovered adjustment problems of the talented underachievers, made it inevitable that counseling procedures be used in one major attempt to deal with the problem. While much has been written about the need for more counselors, the research findings on the effectiveness of counseling in modifying the life pattern of the gifted underachievers is not encouraging, to say the least. The number of controlled research studies is quite limited, but those that are available do not reveal striking positive results. Baymur and Patterson (1960) evaluated three different methods of helping underachieving high school students. One group of underachievers was individually counseled, the second group received group counseling, a third was given a one-session motivational talk, and the fourth was a control group who received no counseling at all. There was only a slight nonsignificant tendency for the counseled students to have a higher grade point average than the noncounseled students at the end of the treatment program, and no substantial changes were noted in the self-concept from this short-term counseling. The one-session motivational talk or inspirational interview seemed worse than nothing at all and indicated the complete failure of exhortation as a means of positively modifying the behavior of underachievers. Neither individual nor group counseling showed clear superiority in this study.

Group counseling is clearly the preferred method from the standpoint of professional economy; an attempt to report effectiveness of group counseling was made by Broedel, Ohlesen, Proff, and Southard (1960). The study was worked with four groups of underachieving ninth graders. The theoretical base for the treatment was that if a student discovers that his peers can accept him, he will be better able to accept others and, finally, better able to accept himself. A further assumption would be that better self-acceptance would lead to more effective academic performance. Again, the results revealed little in terms of group differences in either self-concept or achievement although some improvement was noted in individual cases.

In another attempt at group counseling, Mink (1964) reported on the counseling of eight underachievers at the secondary level paired on IQ and sex with a control sample. All the students had scored 116+ IQ on the Lorge Thorndike and were doing below average work or failing in three or more subjects. The students received eleven 45-minute sessions with the school psychologist, who began counseling in a client centered philosophy and gradually became more directive as the sessions progressed. The emphasis in the sessions was on goal-setting and on cognitive rather than affective goals. In addition, the parents were seen for two sessions. No group differences were obtained on a scale of values, study habits, or grades, and the author concluded that more work could profitably be done with the parents.

Similar limited or negative results obtained from counseling gifted underachievers have been presented by Winborn and Schmidt (1961) and Caldwell (1962).

One of the few encouraging studies on counseling was reported by Shouksmith and Taylor (1964), who evaluated the effect of a short period of counseling on children of high intelligence and low achievement. Three groups of 12 children each (CA 12-13) were matched on IQ, sex, and achievement in an intermediate school setting in England. The experimental group received individual attention weekly or bi-weekly with the parents of the counseled group seen twice during this period. A control group of youngsters were given some test administration during the six-month period in order to provide a type of *placebo,* while the other control group received no attention at all.

At the end of the counseling, eight of the members of the experimental group could no longer be classified as underachievers. Improved peer acceptance was noted by the teacher of the experimental group, while the members of the control and *placebo* groups did not show meaningful change. The authors particularly mentioned the helpful cooperation received from the parents of the experimental group, which may have had considerable impact on the favorable results obtained on the study.

Shaw (1960) introduced a variation of the theme on counseling by including a family counseling technique involving the underachiever and his parents. The student was first seen by the counselor in a group with other adults, not his parents. Then gradually the true family was seen together. Shaw used 12 groups of 12 parents, eight of the groups coming from the twelfth grade population and four from the seventh grade. The parents had four therapeutic sessions of 90 minutes each. The major aim of such counseling was to increase and reestablish lines of communication between the parents and the child that had long since atrophied. By traditional evaluation methods, again, little was obtained except an indication that students were able to talk freely in front of adults and to some extent with their own parents.

Before one reaches a conclusion on the effectiveness of counseling as a procedure for intervening in the lives of gifted underachievers, a few research problems concerning the above studies need to be noted. First of all, counseling 1 is not the same as counseling 2. Some of the experimental programs seemed more precise in evaluation techniques than they were about the nature of the counseling itself. The counseling sometimes seems to be done over a very short period of time during which no substantial results can really be expected. The counselors may have had limited experience—for example, a student working on his doctoral degree. There has been some speculation that using grades as a final criterion of success may be too harsh a standard. The first reasonable expectation for change would lie in the attitudinal dimension, and only after the attitudes and values had been modified, would one expect gradual changes in behavior. There is accordingly some belief in an "iceberg effect" in which the major benefit of counseling might reveal itself some time after the counseling ceased when the person had time to reorganize his self-concept and decide on behavior changes he wished to make. Finally, the nature of such experiments leads to very small samples of youngsters, often ten or less in the experimental group. Statistically significant differences between groups would depend upon the majority of the students showing substantial gains. If one or two of the youngsters showed a very negative response to counseling, the statistical probability for obtaining differences between groups is almost eliminated despite clear gains made by some individual students. It is perhaps more reasonable to look more closely at the successes and failures *within* the counseling situation in order to identify those factors influencing these different results than to make vague comparisons across groups which do not seem to bear much definitive fruit.

Educational Programming

By far the majority of the work done on underachievers has been applied at the junior high and senior high level. This fact reflects the availability of counseling personnel rather than any deliberate choice of research strategy. Most investigators would readily admit that by far the most desirable approach to the problem would be to identify these youngsters as early in their school life as possible and begin remedial efforts at that young age. The previous findings of Shaw and McCuen suggest that underachieving boys can be identified as early as the third grade.

Few attempts have been made to compare educational programming with counseling as alternate strategies for dealing with underachievement. One attempt to work at the elementary level has been carried out by Miller (1962). Three groups of underachieving children of about 35 members each were identified, and one group of children was assigned to counselor group sessions. The second group received individual tutoring from a reading specialist, while the third group acted as a control sample receiving no special treatment. Over one semester no significant changes were shown by any of the groups on reading scores, again substantiating how difficult it is to modify the patterns of adjustment of such youngsters in short-term studies whether one uses counseling techniques or remedial education methods.

One long-range effort has been reported by Goldberg (1959). Thirty-five secondary level students who had obtained IQ scores of 125+ but had low grade-point averages were given a special educational environment. These students were grouped together in a home room with a teacher who was also their social studies instructor. The teacher was warm, receptive, and flexible in his demands on the students, and they responded by earning slightly better grades than did the control sample during the first year. During the second year of the experiment however, the same group was placed with another teacher who held rigid, high standards and was not as personally warm. Under these circumstances, the group of underachieving students rebelled and at the end of the year were no further ahead and, in some cases, were behind the control subject.

An interesting reaction to special placement of underachieving students was reported in another study by Goldberg, (1959). She selected high IQ students, 125+, who had failed in ninth-year mathematics, and placed them in a first-year geometry class with an outstanding teacher. Some of the underachieving students responded very well to this program. About half of the experimental group scored in the upper 20 percent of the national distribution for the test norm, but the remaining half of the group scored well below the median for the test and also showed a high incidence of truancy. Even those students who showed a remarkable advance in the area of mathematics did not generalize the performance to other subjects, but instead showed serious failures or near failures in other areas. When another teacher took over the class, due to programming difficulties, no differences were found between experimental groups and control groups on the Regents Examinations at the end of the year. Instead of an experimental control group comparison, it would seem to be more fruitful to investigate the characteristics of the students who responded positively to the initial injection of mathematical excellence in their program as opposed to those who continued their underachieving pattern. Such results might give us a clue as to how to program more effectively in the future.

Still another attempt at modifying classroom placement was reported by Passow and Goldberg (1962). In this instance, three groups of underachievers were identified, with two of the groups being placed in homeroom guidance classes which remained together for the three years of senior high school. Members of the third, the control group, were distributed through other sections, as they would be under normal circumstances. Substantial differences were noted between the two special teachers. One teacher was warm, outgoing, and helpful to the students while the second was rather inconsistent in discipline and seemed to take less interest than did the teacher of group A in individual students. At the end of their high school program, all three groups were compared on grade-point average and scores on Regents Examinations and aptitude tests. While group A (with the warm, helpful teacher) did have somewhat higher ratings, none of the comparisons among the groups proved statistically significant. Again, we see how very difficult it is to modify the essential adjustment patterns of the students. The authors did comment further, however, on what they felt was the importance of the personality characteristics of the teacher who has extensive contact with these students.

Karnes, McCoy *et al.* (1962) tested the effectiveness of another type of school modification by placing underachievers with achievers at the elementary school level. From a total of 223 pupils in grades two to five who had Binet IQ scores of 120+, 50 underachieving students were chosen for the study. The definition of underachievement in this case was that the student's actual achievement fell more than one standard deviation below the expected on the basis of a prediction formula. Twenty-five of these students were accepted as experimental subjects and in the one school that they attended were placed in special classes for gifted students. The control group was composed of gifted underachievers who remained in a heterogeneous situation in other schools and were not grouped for ability.

A series of achievement tests, creativity measures, and scales measuring peer and parent acceptance was given on a pretest and posttest basis. The two different organizational systems were in effect for two to three years. At the end of that time, posttests revealed significant gains for the experimental group in school achievement and intellectual fluency in the creativity battery. No differences were obtained in peer acceptance, but a significant gain appeared in parent acceptance in the experimental sample.

While the experimental group seemed to be significantly higher than the control group on IQ scores at the beginning of the experiment, the use of a predictive formula was believed by the investigators to erase that possible advantage. The authors tentatively concluded that placing underachieving youngsters in this special grouping program was beneficial. In the case of all such special programs, it would be wise to replicate this study in other school systems and with other age groups before reaching any general conclusions on the efficacy of this approach. What these authors have done is to carefully test one idea in this area and open the door for further related studies.

In summing up the results of either the counseling or the special educational programming efforts at intervention in the life pattern of the underachiever, one is struck by the indifferent success that has been obtained. This limited success probably reflects the limited resources applied to the problem. The initial attempt to deal with a problem in the schools has almost always consisted of applying the least possible modification of the existing program; if that does not work, then the investigators go on to something more drastic. The evidence now available seems definitive in suggesting that substantial modifications are needed in existing practice if one is to expect any meaningful modification of the underachieving pattern. Long-term counseling under competent and experienced management apparently would be necessary, and/or a carefully designed and long-range program on educational planning and curriculum adjustments. Seemingly nothing short of these two sustained efforts, separately or in combination, has much promise of any substantial returns for these students.

Educationally Disadvantaged

The great emphasis on improving education for children from educationally disadvantaged circumstances has rarely focused on the talented end of the distribution, spending most effort on remedial methods for those in trouble.

One of the most extensive attempts at improving the educational program for deprived but talented youngsters was provided in the demonstration guidance project conducted at George Washington High School in New York City (Hillson and Myers, 1963). This was an attempt to provide a wide variety of needed services for youngsters of good potential coming from disadvantaged circumstances. A total of 365 students were involved; the special group was 54 percent Negro and 26 percent Puerto Rican, but the high school itself was a mixture of middle C- and lower-class backgrounds.

Among the special aspects of the program, an attempt was made to provide individual counseling; 20 percent of the group were given intensive counseling for personal difficulties provided by a clinic team of psychologists and social workers. The students in the program were grouped homogeneously in the major subject areas on the basis of test data and school records. A major program of cultural enrichment was introduced, in which the students were taken to operas, concerts, plays, etc.

Classes in the school prior to the initiation of the project were compared with the classes in the program itself.

TABLE XVII. ACADEMIC PERFORMANCE UNDER DEMONSTRATION GUIDANCE PROJECT

(Hillson and Myers, 1963)

	Pre-Program 1957-59	*Program* 1960-62
Academic Diplomas	43	109
No Failures	14	44
80% average or above	11	37
85% average or above	2	15

As can be seen by Table XVII, there were more academic diplomas awarded to the program youngsters, and their success in the academic program was measured by the lack of failures, and more students with high averages can be noted. In addition, seven of the project students ranked in the first ten of their class during the three years of the special program, a rank not attained by any members of the preproject classes.

The recommendation of the project staff is interesting as it regards the talented students. They conclude,

> We believe that all of our disadvantaged young people should have the benefit of the best education possible, but if lack of funds or personnel or other factors make impossible special programs for all, at least those with the most potential should be helped. If justification is required for singling out one group, it can be found in the needs of the community. (p. 29)

It was out of this project that the wider-range Higher Horizons project was begun in New York City to begin at the elementary school level and extend through the secondary school level, although with less intensive application of personnel and resources.

Department of Redundant Research

The evaluation of the influence of counseling on underachieving gifted children provides a rich field for connoisseurs of redundant and nonproductive research design. The foremost of these is the comparison between a group of students who have undergone "counseling" and a control group that did not. Such studies, completed on this design yield ambiguous results, at best. Part of the problem revolves around the difficulty of determining just what is meant from one study to the next by the term *counseling*. Is it Adlerian counseling or neo-Freudian in nature? Is it being applied by a practitioner with twenty years of experience or an advanced graduate student fresh out of his practicum course? Did the counseling last three sessions or thirty-three?

One of the great needs for studies in this area is a detailed report on precisely what the treatment variable is, in terms of content and style of application. Unless such detail is provided any useful interpretation of the results is highly unlikely.

The lack of clear cut results coming from such studies has led some investigators, and some counselors, to engage in what might be referred to as the "feelie" approach to evaluation. The basic approach is to say "Well, perhaps you didn't find any differences on your measures but I just know that significant things happened in the group. I just FEEL it." Such a reaction tends to ignore one of the fundamental knowledges that should come from the counseling field, namely the ease with which one can practice self-deception. If nothing can be measured indicating change, even though change was felt to take place, the self-deception of the counselor or the researcher must be considered as one possibility along with the inadequacy of measuring instruments.

A more sophisticated version of this approach is the response, "While it is true that no changes are apparent now (end of treatment), it is likely that the individual has to have time to pull together what he has experienced and the real gain from the counseling cannot be expected until long after the actual counseling has ceased." Maybe so. At any rate, this is a testable hypothesis and worthy of study. It should not be acceptable without solid evidence and may well just be some more self-deception.

CHAPTER 10

NEEDED PERSONNEL

One generalization that can be drawn from the preceding information is that special programming for gifted children requires additional personnel and services. We should disabuse ourselves of the notion that already overworked teachers and administrators can absorb one more special program into the already overcrowded and understaffed general program. Nothing illustrates the futility of efforts to do this more than the well-meaning attempt to provide enrichment for gifted children in the regular grades. It is wishful thinking to suppose that hard-working teachers without sufficient content knowledge, without special knowledge of gifted children, without time for planning programs, and with limited assistance from supervisory personnel could alter, in any meaningful degree, the educational situation for gifted children.

The growing recognition of this fact is exemplified in the reports of Illinois county committees for the 1960 White House Conference on Children and Youth. More counties (49) recommended the need for establishment of classes for gifted children than for any other special service. No rejuggling of administrative staff on paper will produce more effective education for these children unless more highly trained personnel are given the opportunity to use their special talents to work with these youngsters.

What do we know about the persons who might work with gifted students? The straightforward answer is that we know very little. The vast majority of published material on this topic is based on the experiences of authorities, on reports of the teachers themselves and, in some cases, on the opinion of the students.

Numerous lists have been developed of the supposed characteristics of the teacher of the gifted. Abraham (1958) has pointed out that most lists dealing with the supposed characteristics of teachers of gifted children include practically all of the virtues of mankind. He has collected two printed pages of such characteristics of which the following are only a small sample:

Versatility of interests.
Good health; physical superiority; athletic ability.
Creativeness; inventiveness; originality.
Participating member of the community.
Unusual proficiency in teaching a subject or subjects.
Clear and consistent philosophy of education and professional ideals.
Capacity for allowing others to assume responsibility.
Knowledge of theories of learning and other areas of educational psychology.
Writing for and using materials of professional publications.

Abraham comments, "Which paragon of all that's wonderful could measure up, and who would be presumptuous enough to say that he is qualified to be a teacher in the face of these all-inclusive check lists?" He might well have added that the list omitted one more characteristic, an almost complete ignorance or indifference to practical economics, since anyone with the above characteristics should be able to double or triple his teaching income in any number of other jobs. Obviously this list-making of mankind's virtues does not get us much further into what the minimum desirable characteristics are of a teacher or specialist for the gifted.

What we need to know are the answers to much more specific questions, such as:

1. Should there be different requirements for elementary and secondary teachers?
2. Should there be different requirements for supervisors and those working directly with children?
3. How intelligent should the teacher of the gifted be?
4. What personality characteristics are undesirable for working with gifted individuals?
5. How much special content knowledge and training is necessary for various levels?
6. How much, if any, prior experience with normal or gifted children should be required?

There is a type of vicious circle attached to this problem. As Gallagher (1964) stated, "The reason for the general lack of information about teachers of gifted children is that there are few such teachers and few training programs devoted exclusively to the education of gifted children. . . ." With the employment of more special teachers of the gifted, there will be more opportunity to study their unique characteristics.

Evaluation

The minimum type of research study that one would look for would be a comparison of personnel who have had successful experiences with gifted children with personnel who have had unsuccessful experiences. Even such a beginning study has not been done, so one is forced to rely upon the opinions and observations of those close to these programs. While such opinions give much valuable information, they are obviously not without bias and need to be treated most cautiously.

Evaluation by Pupils

Davis (1954) reports the results of two studies which attempted to obtain, from upper elementary classes of gifted children, their opinions as to what constituted the most successful teacher. The list of major characteristics was as follows:

1. Sense of humor
2. Encouragement of responsibility
3. Knowledge of subject

4. Firmness and fairness
5. Understanding of children
6. Enjoyment of teaching

As Davis recognized, the above characteristics could be claimed by a good teacher of any group. She concludes, "Raise the characteristics of a good teacher to the highest point of development, and you will have a gifted teacher for gifted pupils." Offhand, one might say that if this were true we would have only to stand outside the teacher training institutions and tap the very best graduates on the shoulders and we would have what we need.

However, a closer examination of these points suggests that perhaps more is required than just that. Knowledge of subject matter field may well entail considerably more extensive background and training for teachers of these children than for teachers of other, slower groups. An understanding of children in the general sense may not be enough if that understanding does not include a knowledge of the particular intellectual strengths of the gifted child and. of how they can be incorporated into the curriculum. There does seem to be one other characteristic of a good teacher that the children themselves could be pardoned for overlooking. Extensive knowledge of the subject field does not necessarily mean that the possessor of such knowledge will be able to order it and present it in palatable and efficient form to immature, if intellectually gifted, minds. While the opinions of these children are interesting, they do not seem to advance our knowledge too much. Let us see, instead, what the administrators of such programs and schools have to say.

Evaluation by Administrators

Norris (1958) has listed guidelines by which teachers are chosen for the Major Work Classes in Cleveland, one of the major special class programs for gifted children during the past three decades. Amid many of the personal virtues mentioned by Abraham above, several other characteristics deserve special mention.

One requirement is that the teacher should already have had experience of two years or more in the average classroom. Such standards are also held in the special class program in Toronto, which is patterned closely after the Cleveland program. The training expected of the teachers includes knowledge of child development, educational psychology, psychology of individual differences, counseling, and teaching methods.

Havighurst and DeHaan (1963) mentioned four general characteristics related to successful teaching of gifted children based on "observation of teachers who have worked effectively with gifted children in special groups and in the regular classroom."

1. They are flexible and creative persons.
2. They are concerned with individual differences.
3. They are resourceful in developing teaching techniques.
4. They want to teach gifted children.

With the exception of the last point, these characteristics could well serve as a basis for training teachers of the mentally retarded as well as of the gifted. Again, the essential differentiation—if any is needed—between the teacher of average children and the teacher of the gifted is missing.

Hildreth (1952) points out that the teacher of gifted children needs "to have a wealth of experience combined with a broad cultural background which will have developed an inquiring mind . . . sympathetic viewpoints, and a sound philosophy of life. It is reasonable to assume that this teacher will be well read beyond the average." This general concept of breadth of experience and knowledge constantly reappears in various lists.

Wilson (1958) surveyed graduate students in a course on *Education for the Gifted*. The results suggested that the teacher of the gifted must be gifted himself, one of the few clear statements regarding the intellectual resources needed by the teacher. In addition to broad characteristics such as tolerance, sense of humor, good will, fairness, etc., the teacher should have a broad range of skills and accomplishments which ensure the enrichment of the gifted child's mental and emotional life.

Teacher Attitudes

What do the teachers themselves feel about their preparation or about the need for special provisions for gifted children? Justman and Wrightstone (1956) obtained attitudes towards special classes in New York City from a variety of teachers who had had and some who had not had specific experience with these special classes. They found that

a. The teachers who had had experience with the classes were more favorable toward them than those who had not had such experience.
b. Teachers with less than 20 years' experience were more favorable than were teachers with more than that.
c. Thirty-four percent of the teachers would have liked to see these classes abolished. This high percentage will give some pause to the administrator. A teacher with such an attitude could hardly be expected to do the best job in this kind of situation.

A survey was done in Portland (1959) of the teachers involved in the program of partial segregation of the gifted. The essential teacher characteristics on which the Portland teachers were most in agreement were

1. Greater knowledge of the subject.
2. Ability and willingness to encourage questions and independent study.
3. Willingness to work harder.
4. Respect for and interest in gifted children.

The teachers wanted both content and methods by which to apply the content most effectively. The type of teacher workshops conducted as reported below also suggests the needs of these teachers.

Elementary School Workshops

1. *Background*: A study was made of the nature of giftedness, intellectual ability, the Portland program, other programs, acceleration, special schools, enrichment.
2. *Enrichment*: The nature of the heterogeneous class, resource material and research material, extension of suggestions in the Portland teaching guide, community resources, other enrichment suggestions.
3. *Identification-Teacher Observation*: A study of the teacher's ability to observe children objectively and development of the teacher's ability to identify gifted children.
4. *Problems*: Further discussion and study of problems developed in the first three areas.

High School Workshops

1. *English*: Emphasis on student composition. Study of selective literature and separate courses in creative writing.
2. *Social Studies*: Methods and concepts of anthropology. This was followed by a study of the relationship of geographic environment to cultural differences.
3. *Mathematics*: Review areas of higher mathematics. Examine new methods and materials.
4. *Science*: Seminar approaches in biological and physical sciences.

Selvi (1953) reports one of the few organized attempts to deal with the content shortage that has been reported by teachers and administrators. In the Teachers College of Connecticut, elementary education majors may select a special elective program which will give them depth in a special subject area. One example of such a program in *science* would be the following sequence of courses:

Introductory Physical Science
Advanced Physical Science
Field Biology and Conservation
General Zoology (I and II)
General Botany
Anatomy and Physiology Parts I and II
Introductory Geology
Elementary Curriculum Materials—Science

According to Selvi, teachers with this type of training background could be used as specialists in a variety of different situations. For example,

1. They might be used as regular classroom teachers, but would be always available as resource persons, to help other teachers to plan and carry out special activities whenever called upon.

2. They might take charge, for several periods of time during the week, of a special class of gifted children taken from several rooms, while their own homeroom pupils had a library period under the supervision of the librarian.
3. They might exchange classes for one or several periods with other teachers.
4. They might be used as roving teachers in a given system to substitute for others in case of illness and have charge of special classes when not on call otherwise.
5. They might be used exclusively as specialists and move from room to room in a given system.

Selection and Training Procedures

There seems to be little in the descriptions of available training programs to suggest that they will attempt to develop some of the desirable personality or attitudinal characteristics necessary to good teaching. Much stress was placed on the value of *high drive, broad knowledge, ability to share responsibility with the children*, etc., but it is difficult to see how a one- or two-year program could hope to instill personality characteristics or attitudes if they have not been forming in the course of 20 to 30 years. The other possible solution is to look for people who have these desirable characteristics before entering the program. This would call for some extensive history taking, perhaps some personality and intelligence tests, and personal interviews. A successful selection program would provide the rich soil from which could flower the special knowledge that would be included in the content of the curriculum itself.

Fliegler (1964) has proposed the following courses and experiences for a training program for personnel to work with the gifted:

The psychology and education of gifted children.

The curriculum and programs of instruction for gifted children.

Practice in the education of gifted children; observation and student teaching; field experience.

Special courses in the content area: science, mathematics, social studies, English, foreign languages, etc.

Research problems in the education of the gifted.

There is general agreement that the teacher should acquire greater knowledge of the gifted child, his unique combination of characteristics, and some familiarity with past educational attempts to meet these needs. These courses would probably include some extended discussion of creativity, originality, and critical thinking abilities.

The despairing cry of the teachers for more content knowledge must be met by such a program. The teacher must know mathematics in order to enrich mathematics content for gifted children, must know history if he is to enrich their history course content, and so on. The average teacher has had only a smattering of information in many fields wherein he may come face to face with the precociousness of gifted children. Something akin to Selvi's program, as described above, would seem to be a minimum, so that the teacher could be a specalist in at least one content area. It would be easier to build on an already established rich background of experience than to try to provide them all in one year. Perhaps selection should weed out the eager but essentially uneducated person (from a liberal arts standpoint) from the program for teachers of the gifted.

Another area of importance is the development of methods for dealing with these children. There do seem to be some unique methods that could be presented to the teacher, which could aid him in his work with gifted children. For example, practically all of the comments from existing programs have suggested that more responsibility be given to the children in the development of their own program. Does the teacher know how to provoke discussions in a classroom of bright youngsters, how to get the discussion back on the track when it has been derailed by a tangential comment of one of the students, how to encourage dissent without encouraging revolutions, and does he know the kind of question to ask that will best lead to creative and critical responses from the children?

Most of all, the prospective teacher of the gifted should be able to try out these new methods under adequate supervision. Some sort of practicum arrangement needs to be inserted in any training program. The available information suggests that we would not be far wrong if we adopted these general points as the skeleton upon which to build a training program. As experience with the programs themselves increases, necessary modifications can and should be made. These will be made effectively if the training program keeps systematic records of the students and conducts its own investigation into the question of who is the most effective teacher of gifted children.

While most of the written material on training has to do with teachers in a regular college setting, the emphasis in the Illinois state program on training has led to consideration of how inservice and advanced programs in this field can be utilized. Jackson and Rogge (1965) have presented a model of inservice training programs for teachers, consultants, and supervisors for gifted children. This program, presented through summer institutes, relies upon four major assumptions:

1. Teachers, consultants, and supervisors should engage in vigorous self-assessment of prevailing practices. (This would include analysis of examination questions, student-teacher interaction, and student description of the classroom.)
2. Models of the goals must be provided, not just statements of the goals. (This means that the presence of demonstration classes, use of video-tapes of classrooms, etc. are available for such a model as part of the training program.)
3. Teachers, consultants, and supervisors must have an opportunity to practice while still in the inservice program.
4. Teachers, consultants, and supervisors must have opportunities to continue the processes of self-assessment after the close of the inservice program.

A questionnaire to 120 demonstration center personnel requesting them to express their particular needs revealed the following items mentioned by over half of the group, demonstrating a need to

A. Be able to gather evidence on student growth in
    - Thinking
    - Creativeness
    - Leadership
    - Self-image.

B. Learn classroom procedures that would:
    - Nurture creativity
    - Conduct independent study
    - Use inductive teaching
    - Work with underachievers
    - Improve student-led discussion
    - Prepare exam questions for higher thought processes.

C. Locate and create new models of teaching.

D. Use classroom observations and teacher interchange.

Gallagher (1966) reported on a leadership training program at the advanced graduate level that is being supported under the Illinois State program. In addition to the usual coursework relating to administration and developmental processes, he stressed the need for persons working with gifted children to have a content specialty so that they feel comfortable in at least one content area. Much of the student time in the leadership program is devoted to individual projects and study plus field experiences such as visiting demonstration centers, attending advisory council meetings, and evaluating one of the programs for the gifted in a school system. Results of the first year of independent study work for these fellows is presented in the section on Research in the Illinois State Program.

Department of Redundant Research

There are not many research designs that would fit under this category since so few investigations of any sort are available in this field of professional preparation. However, one pitfall that might profitably be avoided is the listing of needed characteristics by collections of experts. These lists almost always add up to a set of cliches that could just as easily be used to search for teachers of the mentally retarded as for the gifted. What is really needed is the actual study of the teaching process in relation to gifted student outcomes. What kinds of teacher strategy or questioning results in the student becoming freer and more able to express himself coherently? What kind of teacher strategy encourages independence and truth-seeking behavior so actively sought after with these talented youngsters? These and others like them are the questions that will stimulate useful research; that will provide a better understanding of the nature of training for a specialist in this area, and establish the basis for a true science of pedagogy.

CHAPTER II

ILLINOIS STATE PROGRAM RESEARCH AND DEVELOPMENT

This section deals with the research findings obtained through one of the five sections of the Illinois Plan for Gifted Children. This program was initiated with a small legislative appropriation for pilot studies in 1959 which continued for four years and led to full legislative support in 1963. This program under the initial leadership of David Jackson and later Wayne Newlin and Herbert Baker has made a significant impact in a number of educational dimensions in Illinois. The excitement and activity generated by this program underlines the value of categorical aid applied to a specific subgroup of children with special needs. A brief description of the total plan is given below.

Origins of the Illinois Plan[5]

In 1959, on the recommendations of the Illinois School Problems Commission, the General Assembly established the Special Study Project for Gifted Children. The purpose of the Special Study Project, which operated from 1959 to 1963, was to secure data, information and recommendations to assist the General Assembly to determine whether permanent legislation to assist districts in providing for gifted children is needed and desired, and the nature of such legislation, if desired.

Under two successive biennial appropriations of $150,000.00 each the Special Study Project supported a total of 44 study projects in school districts and universities.

An Advisory Committee of highly qualified educators employed the data and recommendations of the study projects, the Gallagher report (the previous *Analysis of Research*) and their own experience in drafting a preliminary set of recommendations for state action.

The preliminary recommendations were presented to leaders of educational, civic, professional, labor, industrial, and social service groups at a series of five Governor's Conferences on Developing the Talents of Illinois Youth in May, 1962. Governor Otto Kerner gave the keynote address at the Conferences at the University of Chicago and in the State Capitol. The keynote address was delivered by Lt. Governor Samuel Shapiro at Southern Illinois University, Eastern Illinois University and Rock Island Senior High School. Total attendance at the Governor's Conferences was 1,300. The reactions of these participants were extremely useful in the further refinement of the recommendations.

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[5] Taken from *Illinois Plan for Program Development for Gifted Children*. Springfield, Ill.; Office of the Superintendent of Public Instruction, 1963, pp. 3-7.

Legislative Action

The five recommendations which make up the Illinois Plan were presented to the School Problems Commission at hearings in September and December, 1962. After careful consideration, the commission voted to approve the recommendations, and to have bills drafted to implement them.

On April 18, 1963, Senator Edward Eberspacher introduced Senate Bill 749 on behalf of the School Problems Commission. Senate Bill 749 was supported actively by the Honorable Ray Page, Superintendent of Public Instruction, who made the proposed Illinois Plan a part of his legislative recommendations. Governor Otto Kerner included the $6.75 million appropriation of Senate Bill 749 in his budget, and the Illinois Plan was made a part of the administration's legislative program.

Senate Bill 749 was passed by both houses of the Seventy-Third General Assembly by unanimous vote. Final approval was given by the Governor on August 5, 1963.

The Five Parts of the Illinois Plan

I. Reimbursement for Services and Materials

Under this program, any school district in Illinois may submit a plan for improving its services to gifted children. Such proposed plans must set forth clearly and concisely the following features: (1) a description of the population to be served; (2) a statement of the qualifications and duties of the special personnel in one or more of these categories: diagnostic services, counseling services, and consultative services; (3) a description of the books and materials needed.

II. Demonstration Centers

The major purpose of the demonstration centers is to provide for all Illinois educators and other citizens convincing and readily accessible demonstrations in operating situations of a number of particular approaches to the education of gifted children.

Demonstration centers exemplify the following approaches:

1. Acceleration of highly gifted pupils.
2. Individualized instruction through such means as team teaching, nongraded plans, independent study.
3. Special classes for the highly gifted, with specially trained teachers and supervisors or consultants.
4. Special attention to gifted youth among socially and culturally underprivileged groups.
5. Curriculum improvement through programs which emphasize higher-level thought processes, creativity, divergent thinking.
6. Special attention to the emotional and social adjustment of gifted pupils.

Plans call for five or six demonstrations of each approach in school districts in different parts of the state, so that visitors may see any of the approaches within 100 miles of their own schools. Each demonstration center is responsible for showing the program to visitors and for carrying on an evaluation of the program.

III. Experimental Projects

The major purpose in providing state assistance for experimental projects is to assist school districts to carry on significant experimentation which will advance our knowledge about practical programs for gifted children.

Essential Elements: An experimental project may be carried on by a local school district, involving the district as a whole, or selected grade levels, subject areas, or school buildings. Each experimental project will have the following characteristics:

1. The new program being employed experimentally is derived from previous research.
2. It illustrates new procedures in the educational process.
3. It includes an evaluation phase based upon the collection of data which will give some measure of the effectiveness of the procedure.
4. Regular provision is made for reporting the results of the experimentation.

IV. Field Consultants at the State Level

To administer the planned program development for gifted children, including the program of reimbursement, the demonstration centers, and the experimental projects, a Department of Program Development for Gifted Children has been established in the Division of Instructional and Pupil Personnel Services of the Office of the Superintendent of Public Instruction.

A staff of field consultants is being recruited to provide knowledgeable help in the planning and operation of demonstration centers, experimental projects and teacher training activities.

V. State Support for Programs to Increase the Number of Specially Trained Personnel

To help meet the great need for specially trained personnel to provide consultative services, including the leadership of inservice work with teachers and diagnostic and counseling services, it is proposed that state support be provided for:

1. A program of fellowships for able persons who are being trained for these positions.
2. One or more academic year institutes.
3. Several summer institutes.

Table XVIII summarizes the rationale and presents the level of support available for each section during the current biennium. The research section has over one-half million in funds for these two years. This provides enough funds to support pilot studies, local evaluation attempts, and some curriculum development. It does not permit sup-

TABLE XVIII. ILLINOIS STATE PROGRAM FOR GIFTED[a] 1965-67

Section	Biennial Appropriation	Rationale for Section
I. Reimbursement	$4,900,000	Provides support through formula or personnel method for a wide variety of special services for gifted students, the particular nature of which is determined by local needs.
II. Demonstration Centers	1,200,000	Provide centers that would demonstrate excellent educational programming for gifted students so that visitors would become aware of new developments, could decide whether such innovation fits their school, and could receive help for developing talent in their own system.
III. Experimental Projects	550,000	Research support given to program development efforts such as curriculum innovation and to efforts to evaluate or investigate the impact of the various programs for gifted students.
IV. Training	750,000	Provides support for summer workshops, in-service training programs, year-round fellowships and scholarships to provide competent professional personnel to staff other elements of the program.
V. State Staff	350,000	Provide administrative leadership for program, coordinate the various elements of the program, and provide consultant help for school systems on program development for the gifted.

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[a] See October, 1965 *Illinois Journal of Education* for fuller description.

port for major curriculum projects nor major longitudinal studies nor basic social science research projects which are encouraged to seek support elsewhere, sometimes after getting some planning or initial funds through the state program.

This section is divided into two major parts, *development* or the production of new materials or methods, and *research* which deals with more traditional studies on characteristics, evaluation, etc.

Development

As any teacher knows, one of the more serious problems facing the instructor of gifted children is a supply of adequate and appropriate materials which will stimulate the best of their intellectual potential. Therefore, a number of projects were supported through research funds that had as their primary purpose the generation of new materials.

Sands and Hicklin (1965) reported on a project to develop self-instructional materials for gifted students in early primary grades. The specific objective of this project was,

> To create and test a sequence of instructional experiences which would enable a gifted student, while working independently, to develop concepts which were considered basic to a discipline but not usually encountered in the early elementary grades. (page 6)

Other subgoals were to use these materials to stimulate higher mental processes and present them to the students in such a way so that a minimum of teacher skill and participation would be required to supplement the programmed materials.

The project produced 44 self-instruction lessons dealing with atomic structure, the nature of molecules, and measurement. These were presented to the students by means of a tape recorder and a kit of illustrative materials and workbook. Each child operated a small battery powered tape recorder and listened to 15 minutes of voice recording per tape. At certain points in the instructional sequence the child was given a task which would indicate whether or not the instructional objective of the sequence had been attained. The materials went through four revisions prior to major field testing. These revisions were based first on staff evaluation, then on the evaluation of teacher consultants, then on the basis of two trials in particular classrooms.

The major field trial was carried out in 21 first grade classrooms located in 16 different elementary school centers in Bloomington, Illinois and McLean County, Illinois. The students who were given the materials had Binet IQ's of 124 and above. About one fourth of them had Binet IQ's of 135 and above.

Despite some technical difficulties with tape recorders, achievement test data indicated significant gains in knowledge with the units in science and mathematics. Teacher aid was provided in the form of a technical assistance with the equipment and in reviewing some of the materials. A parent questionnaire indicated a strong positive bias for the program. Written comments by the parents were favorable by a 4:1 ratio. When unfavorable comments were made, they dealt with specific situations and not the major project. The results of this field testing led the investigators to conclude that self-instructional modes of learning could be made adaptable for first grade gifted students. No consistent undesirable findings were obtained in the study.

Another effort to supplement the classroom teacher as part of the Illinois State Program is represented by a University of Illinois television project for the gifted. Hennis, Gillespie, and Saltzman (1965) reported the development of three series of twelve half-hour enrichment units in the fields of astronomy, mathematics, and geography. These units, with accompanying workbooks, were produced on videotape and experimentally tested on intellectually superior fifth- and sixth-grade students.

The content area scripts were developed through special curriculum programs at the University of Illinois: the astronomy unit from the Elementary School Science Project, the mathematics from the University of Illinois Committee on School Mathematics, and the geography unit from the Department of Geography. As in the case of the self-instruction materials program at Illinois State University, much prior trial and development, review and revision were made prior to the field testing of the materials.

Five-hundred seventy students in nineteen central Illinois schools were selected to view these units and serve as experimental subjects during the 1964-65 school year. The criteria for membership in this experimental group were that the student have an IQ score above 125, an achievement test score two years above his age group or a recommendation from the classroom teacher. Each student in the experimental sample viewed two of the series and served as a control subject for the third series.

It was hypothesized that the students viewing the lessons would score higher on achievement tests in the subject areas than the students not viewing the lessons. It was further hypothesized that the students viewing the lessons would not suffer in their regular class work and would exhibit more favorable attitudes to the subject areas than students not viewing the telecast.

The results of the testing indicated clearly that learning took place as part of the application of the television units. For the total sample viewing, the lessons improved test scores 30 percent in astronomy, 35 percent in mathematics, and 12 percent in geography. Very few negative side effects were noted in the gifted students during their participation in this program. However, their attitudes towards the three subject areas remained substantially unchanged as a result of the lessons. Also noted was the much greater readiness for the superior student to carry on independent study without consistent support from the teacher. The author suggests that some initial selection of student capability for self-directed study be utilized in order to maximize the usefulness of such a program.

The initiation of another curriculum innovation for self-instruction for gifted students is presented by Retzer (1966) who designed a linear programmed series of exercises in sentential logic. A student can work through these exercises illustrating some of the major principles in sentential, but not inferential, logic at his own pace. These exercises are presented inductively so that the student, by choosing his answers, can gain insight into the larger principles that are represented in the program.

Retzer reported that a field test of these materials in a class of children of superior intellectual ability at the fifth and sixth grades showed all of the students able to complete the program. The total amount of independent study time that the students took to complete the series was between 140 and 205 minutes. On the basis of this experience, Retzer planned to revise and improve the set so that it can be made available for intellectually superior seventh grade students. This would represent still another attempt to provide materials for the student that would allow him to operate relatively independent of the teacher or a particular textbook.

Another type of developmental activity was reported by Almer (1965). This project consisted of the development of a program in linguistic grammar presented by the inductive method of teaching and using curriculum materials obtained from an English curriculum development project at the University of Illinois. The first objective was to master the linguistic terminology, and the second, to apply the knowledge of the linguistics to literature. Some of the concepts learned by the students were the notation of the devices used in ordering language, figures of speech, and common symbols. The frequency of words, ideas, images and general tenor of the selection were listed. Once the students became accustomed to the approach, they could independently work out significant ideas expressed by an author or poet.

The attempts to evaluate the experiment were not entirely successful. Although the subjective impressions of the teacher and the observers were highly positive, commenting on the increased enthusiasm of the students for the work, the standard measure of vocabulary development and English usage failed to reveal significant improvement of the experimental over two control groups. A test especially designed for this experiment proved to be too difficult for all the students, regardless of the group that they were in. One of the effective decisions, in terms of practical evaluation, was the determination of the group to continue the work during the following year.

An attempt to stimulate the vocabulary development and usage of gifted children was reported by Turnbaugh (1965). A total of 75 students were divided into experimental and control groups. The experimental group was given two half-hour periods a week for vocabulary study which consisted of attempts to unlock the meaning of words containing key prefixes and roots, stimulating interest in words and language phenomena, and developing habits of vocabulary acquisition. This was done through the use of a programmed text, keeping vocabulary lists in notebooks, and attempting to understand words in depth through determining their meaning.

Again, the experiment suffered from inadequate measurement. The vocabulary test originally used to determine the growth of the youngsters proved to have too low a ceiling, and thus both groups scored so high on the pretest that they had little room to improve when the experimental program had been completed. A word-building test which tested the ability of the students to retain the meaning of key prefixes and root elements and identifying them and generalizing their knowledge to unfamiliar words showed the experimental group superior. This result would seem to have very little meaning since this is precisely what the students were trained to do in the experiment.

In addition to modifying or making more complex the standard curriculum for talented youngsters, several explorations have been made through the state program in terms of different content that could be presented to them. Schevers (1966) has reviewed the literature on the teaching of values and finds that although this is an often stated goal of the educational system, the explicit or direct instructions on how to teach values is extremely limited. She suggested that one of the reasons for the limitation is the dilemma faced by the educational system as to which set of values should be taught in a society with a substantial diversity in value orientation.

One solution Schevers suggested was that those values should be instructed upon which there is substantial agreement by almost all parts of the society such as "justice," "honesty," etc. A second approach could be to avoid the indoctrination of students with a particular set of values and instead teach the children the skills or methods by which they can reach value decisions for themselves. This would involve helping them see inconsistencies in their own value statements and in learning certain methods by which they can reach decisions consistently on ethical and value problems. Such an approach would seem to have the greatest possibility for adoption in a society which does not like the term *indoctrination*, particularly in this most sensitive area, but does support the notion of an intelligent and well-trained citizenry exercising their right of self-determination.

Research

The more traditional research projects supported in the Illinois program took many forms, ranging from evaluations of training programs to the social status of talented but disadvantaged youth. Each in its on way has contributed something to the patchwork quilt of knowledge of procedures and practices which forms a necessary foundation to a firm educational program.

One of the weaknesses of the many half-hearted attempts at evaluation of training programs has been their vague and global nature. All one has to do at the end of a program where a group has worked hard together is to ask them if they feel they have experienced something worthwhile. The answer is bound to be "yes." This "yes" may reflect the good fellowship and emotional relationships formed during the group's existence, rather than a meaningful training experience that can improve their own instructional programs when the members of the group disband to return to their respective school systems.

Shaffer (1966) conducted a follow-up study on 20 teachers who attended a Summer Workshop on the Training of Elementary School Teachers on Techniques for Working with Gifted Students. In addition to the usual teacher impressions collected at the end of the workshop, the Ryans' Schedule of Teacher Characteristics was administered to the group before the workshop, immediately after the workshop, and then three to four months later in a second posttest. Seventeen of the twenty participants in the workshop were interviewed at their jobs from four to six months after the workshop was completed. These interviews attempted to obtain specific information on what adaptation was made in the teaching program as a result of the workshop itself.

On the Ryans' Teacher Characteristics Schedule, no substantial changes were noted either in the first or second posttest from the pretest pattern. This group of teachers showed themselves significantly more systematic, using more stimulating classroom techniques, and more favorable to democratic ideals than did the norm sample from the Ryans' study. This probably reflected more superior selection techniques of the workshop than the results of the workshop itself.

Of most interest was the adaptation of the critical incident technique popularized by Flanagan (1954) in which the interviewer seeks out a specific instance or anecdote. The teacher is asked to give an *example* of how she prepared the class to do divergent or evaluative thinking, for example. Shaffer found, through the reporting of critical incidents, that the majority of teachers were able to give examples which indicated that they had been able to apply the model of productive thinking taught in the summer workshop into specific practice in their own classroom.

Of particular interest too, was that the majority of incidents reported were in the area of social studies, the content demonstrated during the summer workshop program. This would seem to suggest it is most easy to transfer a specific process or technique in the content area which was directly illustrated and becomes more difficult as one gets away from an area such as social studies and into such a field as mathematics. The further implication was that specific inquiry training or training on the stimulation of productive thinking will have to be demonstrated to teachers in that content area where it will be applied and that generalization of a technique from one content field to another should not be assumed.

Merz, investigating early identification of talent (1966) gave a battery of tests including the Stanford Achievement Test, the Metropolitan Readiness Test, the Goodenough-Draw-a-Man Test, and a test of oculomotor pre-reading to the entire kindergarten class in a suburban community. The basic results indicated again the impressive range of individual differences in mental development that can be obtained in any age group. Approximately 28 percent of the sample tested on the achievement test were found to exceed the norms of first grade students and, by inference, were ready for the kind of instructional program that could be presented at the first grade level.

Prediction formulas were developed combining the results of the various measures in order to determine whether high scores on tests at the kindergarten level could predict first grade performance. With two subsamples of 200 students each tested, it was found that predictions could be made with substantial accuracy through the use of these tests. The valuable instrument was the achievement test, with the Draw-a-Man Test and the eye movement oculomotor not contributing too much to the total prediction.

Stormer (1966) gave the Stanford Binet intelligence test together with an extensive battery of reference tests to over four hundred fifteen-year-old students. His factor analytic approach yielded many factors of intellectual behavior. He suggested that the purpose for identification be used to determine the test battery to be used in such identification.

As noted in the previous section of the evaluating of the influence of ability grouping, much of that research is suspect because of the biased selection of students. Most schools will, when they group by ability, choose the "best" students for the program. If the selection is done in this way, then there is no comparable group from which to match development in either achievement or attitudinal dimensions.

Gallagher (1965b) controlled for this bias factor in his study of the influence on students of attending a university laboratory school. Over a four-year period of time, students who applied to the laboratory school were tested and interviewed to determine their competence to achieve in the program. Since many more students applied for the school than could be admitted, it was possible to place all qualified students in a single selection pool. The students were then selected, by a process of randomization, as to who would go into the laboratory school and who would go into the public school. Five years after the program began, the students still available in the community were invited to take a battery of tests measuring intellectual abilities and attitudes. The payment of a small sum of money to take the battery insured over 90 per cent response of the students identified.

Gallagher found few differences between the special school and regular school on measures of divergent or convergent thinking. In the laboratory school, the intellectual self was rated significantly higher in boys at the senior high level than at the junior high level, while in the regular school program, the intellectual self-concept of boys was lower at the senior high than at the junior high level. The interpretation of this finding was that the induction of the laboratory school boys into a special educational environment with high standards resulted in initial lowering of the self-concept which eventually rose at the senior high level, whereas the gifted students in the regular school program were significantly challenged at only the senior high level, and it was at this time that their intellectual self image decreased somewhat.

The major differences between the groups were found in the attitudinal dimension. Clear differences between the two school environments were perceived by the students. The gifted students in the regular program perceived their school values as revolving around possession of material objects such as cars, physical attractiveness, athletic ability, and social skills, whereas there was a much greater emphasis on intellectual performance and in activities with an intellectual flavor in the laboratory school.

The apparently greater demands made upon intellectual performance at the laboratory school resulted in a significantly greater number of gifted students in that environment expressing negative feelings about school or doubts about their own ability to do well in school. A type of avoidance pattern was noted in which the laboratory school students expressed greater interest in all kinds of nonacademic activities such as shop and physical education. They expressed the desire to seek social contacts in college rather than stimulating ideas. The total pattern seemed to be one in which they had their fill of intellectual activities in the school program and sought other types of experiences in their free time.

On the other hand, there appeared to be a dual culture observed by the gifted students in the regular program. In this teen culture, the gifted students saw themselves as a minority group with goals opposed to the dominant themes of the peer society. Many of them felt that they would have to go against their principles to get in with the leading crowd.

The investigator concluded that the different school environments do influence the attitudes and values of gifted students, and this influence appears greater than any changes in cognitive ability. He suggested that closer attention be focused on the attitude shaping role played by various school environments and cautioned that enthusiasm for work with gifted students should not lead to an over intellectual pressure at the expense of other important aspects of the development of the gifted students.

One of the natural patterns followed by educators is to report in glowing terms the successes that they have had. Nevertheless, we often must face the fact that it is from the close study of our failures that we can improve and strengthen our methods for the future. Simmons (1966) attempted to determine the characteristics of college students who leave a university honors program after their freshman year. Out of 196 honors program scholars who were available at the junior level, 130 returned questionnaires, of which 75 were active at that time and 55 inactive. Simmons examined the results available from a wide battery of measures to find differences between those students that dropped out and those that continued in the program.

The Sears Self-Concept Scale was sent to both groups by mail and returned, but few differences were obtained on this measure. The men who remained in the program had a significantly higher self-concept of their mental ability than did the men who dropped out. With the women, those who remained in the program had a higher self-concept in regard to work habits and social relationships with their teachers. The difference between the patterns obtained in men and women is characteristically followed throughout and suggests that in any type of comprehensive study the sexes have to be separated in order to understand the results.

Since these students took a wide variety of measures prior to entering the program, the scores of these measures were examined for clues for differences between active and inactive students. These measures included the American College Testing battery, the National Merit Scholarship battery, some measures of divergent thinking, the Terman Concept Mastery test, the MMPI, and the Myers-Briggs Inventory (a self-personality inventory scale). The similarities between the active and inactive students were extremely marked, and the few differences that were obtained did not seem to have great relevance. In the men, there were no differences in the performance of the active and inactive males on any of the dimensions of the National Merit or the ACT battery. On the MMPI, only the psychopathic deviant (Pd) scale, representing in this case a mild form of antisocial attitude, showed higher on the inactive men.

The active women showed significantly higher scores on the fluency dimension of divergent thinking and the social studies test of the ACT. Other than these rather isolated scores, there were no differences between the active and inactive women.

Such a study raises many more questions than it answers and probably should lead to a much more comprehensive and detailed study of the inactive students to see if the reasons for failure lies more within the particular student or with the inappropriateness of the program for the needs of these students.

Interventions

While much fruitful information has come from the studies on creativity and its correlates in children, there remains the important educational question as to whether these characteristics are trainable.

Eberle (1965) conducted a training program designed to evaluate the trainability of certain aspects of creative thinking. From a total sample of 311 eighth grade students in an upper-middle class area, 25 matched pairs of students were selected for the experiment. They were matched on the characteristics of age, verbal IQ, and a composite score in a battery of creative thinking tests. The median IQ score for this group in the study was 114, so these students could not properly be characterized as intellectually gifted. Of the 25 matched pairs, 22 pairs completed all of the training and posttesting and were included in the final analysis.

The training group was determined through a random selection of a coin toss. These students underwent 30 instructional 50-minute periods in which the focus of the instruction was to train the students in how to think productively. Every effort was made to make the learning situation as informal and free as possible. The students were divided into study groups of six each. The emphasis in the training was on stimulating the students through exercises in divergent thinking, brainstorming, developing intellectual fluency, etc. They were given a full explanation of the rationale behind brainstorming as well as exercises on how to do it.

The experimental and control groups were given a posttest battery of tests of productive thinking, and the experimental group showed superior performance in the dimensions of fluency, originality, and elaboration. In general, it can be concluded that the training of this group in productive thinking, without reference to specific content field or area, appeared to result in positively changed behavior on the part of the experimental student. Further questions might well be: What happened to the students when the training was removed? Is this type of training similar to an injection of insulin with positive results dependent on periodically administered treatment, or is this training program sufficient to result in permanent changes and modifications of the cognitive styles and abilities of talented students?

One of our current educational paradoxes is that, while we have a stated goal of student autonomy and creativity, much of our intellectual and educational activities seem to be devoted to passive learning and recitation. This paradox has not been lost on educators concerned with gifted students, and Congreve (1965) reports on an independent study program which attempted to help students in accepting some responsibility for their own learning and to provide them with some of the skills to effectively conduct such learning. A series of options was inserted into a regular secondary school schedule in two of the five days per week. These student options could range over ten possibilities from going to the library, to counseling, to student-teacher conferences, or to teacher-led discussions.

Among other findings was the discovery that the most able students selected a learning environment calling for the greatest amount of independent behavior while the lowest achieving students chose the learning environment with the smallest amount of independent behavior! The experience with this method led to the conclusion that complete student freedom is unwise and that even in the most independent of tasks the student needs guidance and supervision in order to make the most effective use of the relatively greater degree of freedom.

Initial attempts to expand these concepts to the elementary school level were also reported. Included in these is an interesting experimental paperback bookshop for an elementary school. Congreve found that a large number of titles could be included in a paperback store and these were enthusiastically purchased by students and parents. This kind of approach provides the possibility of greater individualized instruction at the elementary and secondary level that represents an always stated, but rarely executed, objective of programs for talented students.

Talent loss

Our attention has been focused in recent times upon the educational plight of minority groups in our society. The accumulated results, reported in the characteristics section, indicate that many disadvantaged children tend to appear at the lower end of the intelligence scale. The whole intelligence curve for these disadvantaged groups appears to be pushed downward, presumably by early environmental deprivation. Pettigrew (1964) summarized research on intelligence dealing with Negro and white children and pointed out the evidence seems to support the notion that environmental rather than genetic factors were responsible for most of the racial differences found on IQ scores. Pettigrew suggests that a deprived environment can both deter "true" intellectual development and also serve to mask actual functioning intelligence if the tasks that are being required are those expected of another social class.

As part of the state's concern for talent loss due to environmental impoverishment, a project on the intellectual functioning of talented but disadvantaged children was conducted by Karnes, Zehrbach, Studley and Wright (1965). As part of a larger training study not yet completed, these authors screened six elementary schools having a high percentage of disadvantaged children. Two out of three children in these schools were termed disadvantaged on the basis of Warner Scale rating of occupations and on an index of housing conditions. For the purpose of studying talented disadvantaged children, the top 40 percent, a total of 560 children based on the group IQ scores, were given a Stanford Binet Intelligence test. The top 20 percent in each group in intellectual ability were selected for placement in the project and so the total population was reduced to 380.

Other factors reduced the sample to 118 Negro children and 85 white children who were further divided into upper-lower class and lower-lower class families. Of particular interest was how these elementary-age youngsters performed in education settings. In comparison of both standard achievement tests and the Illinois Test of Psycholinguistic Abilities, the disadvantaged children from both upper-lower and lower-lower class were performing significantly below their expected achievement, as calculated by a standard prediction formula. This would mean that, even if the intelligence tests were underestimating their ability, their school achievement was lower still and provided a rather pessimistic prediction of future attainment.

There were additional differences between the upper-lower and lower-lower class samples with the lower-lower class mothers manifesting more authoritarian, controlling, and hostile rejecting attitudes toward their children. These results, supported by other similar findings, strongly suggest the need for a more heroic program established early in life for the disadvantaged youngster in order to preserve the talent which does exist in these subsamples of our society.

One of many current educational concerns relates to the problem of racial segregation or integration in the schools and its effect on social patterns. In many instances, there has been the suspicion that placing Negro and white children together in the same classroom does not result in any substantial social interaction but rather that two separate social worlds are created in the same physical environment.

Godman (1966) studied the social and working partner choices of 100 intermediate grade students in a special program for disadvantaged-talented youngsters. The students chosen for this program were in the upper 20 percent of their class, and the average IQ for the classes fell between 110 and 120; this is considerably below that score usually obtained for "gifted." In the case of disadvantaged youngsters, it is considered that the score obtained is a minimum, and the "true" potential of the youngsters is of a higher but undetermined level.

In each of four classes, the youngsters were asked who they would prefer to sit next to, work with, or play with. These choices were used as a basis for groupings within the classrooms. The extent of the cross-racial choices was impressive in each of the classes, ranging from 25 to over 50 percent. The amount of cross racial choices varied significantly in the four classes, ranging from 25 to over 50 percent. The patterns of cross racial choices varied significantly in each of the classes also. In only one of the four classes did Negroes choose other Negroes significantly more often than chance expectancy. In one of the four classes, the white students chose white children more often than chance expectancy but in one of the other classes the white children chose Negroes more often than one would expect on the basis of chance.

Sex appeared to be a much more important limiting variable on social choice than did race in these classes, with practically no cross sex choices made. A finding which is consistent with a large body of information regarding the antipathy that boys and girls hold for one another at this grade level.

Intelligence was also found to be not a significant variable in this relatively homogeneous population. On the basis of these findings, it is possible to conclude that there is substantial cross race social choices and that the integration in these classes was resulting in social as well as academic integration.

There have been many projects currently being supported that were not completed at this writing. Table XIX shows the titles of these projects and their principal investigators.

Future

One of the current activities of the Advisory Council and State Staff at this writing is to embark on a major evaluation effort of the entire State program for the gifted. Such an evaluation would hopefully provide the basis for future planning and emphasis.

In American education, the past should always be just a prologue of things to come. Comparing this review of research to the one completed five years ago, certain sharp trends can be noted.

During these intervening years there have been encouraging trends away from the more traditional and more sterile questions regarding identification, acceleration, and grouping. One current emphasis seems to be on exploring the nature of creative thinking and the possibility of expanding the concept of superior intellectual ability itself. The plasticity of intelligence and its implications have been given a greater attention. Current activity is also beginning to reflect a gradual change from descriptions of gifted children to educational program development and modification. Altogether, it has been an encouraging period.

The future of research activities in this field in the final analysis will depend on the researchers showing the same imagination, originality and creativity that educators so hopefully attempt to arouse in the gifted and in all of their students. The Department of Redundant Research introduced in this book has attempted to point out the sterility of plodding over the same investigatory paths and the need for the adventuresome spirit. The need has not been reduced, despite the encouraging signs noted in this volume.

TABLE XIX. EXPERIMENTAL PROJECTS FUNDED—NOT COMPLETED

Department of Program Development for Gifted Children
State of Illinois

PROJECT TITLE	INVESTIGATOR	AFFILIATION
An Analysis of Dimensions of the Intellect Unmeasured by the Standford-Binet Intelligence Scale, 1960 Revision, Form L-M, and Implications for "Typical" Identification Procedures for Gifted Programs in Illinois	G. E. Stormer	Quincy Public Schools
The Efficacy of an Experimental Curriculum for Socially and Culturally Underprivileged Child with High Potential	Reid Zehrbach	Champaign Public Schools
A Project for the Development and Evaluation of a Program for the Academically Gifted Children of the Greater Peoria Area	Leo Bent	Bradley University
A Physics Program to Provide for the Individualization of Instruction Through Laboratory Experiences and Initial Development and Experimental Testing of an Accelerated Two-Year Secondary School Humanities Program	Scott Richardson Karen Connell	Ridgewood High School Norridge, Illinois
An Experimental Investigation of Curricula in Art as They Relate to the General Creative Performance of Academically Superior High School Students	Robert L. Even	Northern Illinois University
A Study of the Interaction of Creative and Non-Creative Students in Relating to Creative and Non-Creative Teachers		
Washington School Talent Development Project	Charlotte Meyer	Decatur Public Schools
Development of a System for Describing the Question-Asking Behavior of Gifted Students in Science Courses	Orrin Gould	University of Illinois
A Day-Treatment Program for Gifted Children in Early Adolescence Whose Functioning is Impaired by Emotional Illness	Philip C. Gradolph	Michael Reese Hospital Chicago
Utilization of an Intrinsic Program to Study the Problem Solving Process of Gifted and Average High School Pupils	William E. Simeone	Southern Illinois University

TABLE XIX—Continued

PROJECT TITLE	INVESTIGATOR	AFFILIATION
An Experimental Project to Test the Impact of an Individualized "Tutorial" Program in Humanities for High School Seniors	Elizabeth Bischof	DeKalb Public Schools
An Evaluation of Procedures Designed to Improve Work-Approach Habits and Attitudes in Under-achieving Gifted Children	Glen R. Thompson	Skokie Public Schools District 68
Experimental Project to Refine and Validate an In-Service Program for the Promotion of Creative Problem Solving	Russell J. Spillman	Chicago Public Schools
An Experimental Language Arts Program for Potentially Gifted Culturally Disadvantaged Primary Children	Lloyd Leaverton	Chicago Public Schools
A Project for the Development and Evaluation of a Program for the Academically Gifted Children of the Greater Peoria Area	Leo G. Bent	Bradley University
Independent Study: Teaching Strategy No. 2	Gary D. Lonnon	Decatur Public Schools
A Cooperative Project for Science Curriculum Development for Gifted Children and for the Study of Certain Student and Teacher Behaviors Within the Framework of a Science Curriculum	Orrin E. Gould	University of Illinois
A Longitudinal Study of the Effects on the Educational Development of Gifted Pupils of an Experimental School Curriculum and an Improvement Program for Teacher Skills	Francis X. Vogel	Evanston Schools District
Independent Learning Project for Gifted Children at Grade Nine and Above	Francis V. Lloyd, Jr.	University of Chicago
Teaching Pitch Discrimination to Primary School Children	Richard C. Anderson	University of Illinois
Field Testing of Teaching Materials for Gifted Students in the Elementary Grades	Theodore Sands	Illinois State University
Independent Study in Asian History	Everette Breningmeyer	Oak Park Public Schools
Experimentation in the Teaching of Creative-Productive Thinking Through Subject Matter Content after Short-Term In-Service	Robert F. Eberle	Edwardsville Public Schools

TABLES

REFERENCES OF INTEREST

Aschner, Mary Jane and Bish, C. E. (Eds.) *Productive thinking in education.* Washington, D. C.: National Education Assoc., 1965.

Contains papers given at a 1963 Washington conference on productive thinking. The individual papers were given by nationally known authorities in this field and represent the most modern ideas and concepts in this complicated and intriguing area. It is potentially useful as a reference book in this area and could be used to stimulate discussion.

Barbe, W. B. (Ed.) *Psychology and education of the gifted: selected readings.* New York: Appleton-Century-Crofts, 1965.

A book of readings with an extensive coverage of the field of giftedness from identification and discussions of hereditary factors and family background to educational provisions and research. As an overview of the total field, it is an effective collection.

Barron, F. *Creativity and psychological health.* Princeton, N. J.: Van Nostrand, 1963.

A highly readable account of the relationship between personality characteristics and creativity, based on a close study of creative adults, with data collected through intensive and detailed case studies.

Bish, C. (Ed.) *Curriculum pamphlets for the academically talented student.* Washington, D.C.: National Education Association, 1960.

A series of over thirteen pamphlets discussing various curriculum adaptations in content fields for the academically talented student based on the results of numerous conferences. Also discussed in this series are guidance, research, and administration, and an interesting annotated bibliography on the education of the gifted is included.

Brumbaugh, Florence & Roshco, B. *Your gifted child: a guide for parents.* New York: Holt, 1959.

One of the few books available that directs its attention specifically to parents. Its discussion is on a more sophisticated level than most of this type of reference work and provides a good background for parents interested in gifted children.

Brunner, J. S. *The process of education.* Cambridge, Mass.: Harvard University Press, 1960.

A report on a conference of noted physical scientists and educators on the current state of education. It presents cogently the basic philosophy underlying much of the new curriculum development in the physical sciences, and it's a good first book to read before tackling any of the individual curriculum areas.

Conant, J. B. *The American high school today.* New York: McGraw-Hill Book Company, Inc., 1959.

One of the most influential books in current education. Conant's survey and recommendations have changed the face of the American high school in the direction of an increased emphasis on academic excellence. Among other things, he is a strong advocate of grouping by subject matter at the secondary level.

Crow, L. D. & Crow, Alice, (Eds.) *Educating the academically able: a book of readings.* New York: David MacKay Co., 1963.

A somewhat uneven collection of articles that seems to be placing perhaps too much emphasis on the exhortatory type of article instead of those based on research. Numerous descriptions of elementary and secondary programs are provided and may be of interest to the reader.

DeHaan, R. F. *Accelerated learning programs.* Washington, D. C.: Center for Applied Research in Education, 1963.

A short volume of 117 pages which attempts to give a general overview of the field to those not acquainted with it. The major point of interest is the description of various programs in action and discussion of the implementation of such programs.

DeHaan, R. F. & Havighurst, R. J. *Educating gifted children.* Chicago: University of Chicago Press, 1961.

A broad definition of giftedness is presented by these authors. They list a large number of talents not usually thought of in intellectual giftedness.

Durr, W. K. *The gifted student.* New York: Oxford University Press, 1964.

A rather standard textbook that covers the field of characteristics, indentification and administrative programs reasonably well. It does not cover new curriculum advances or modifications in teacher style and behavior as much as others.

Freehill, M. F. *Gifted children: their psychology and education.*

A sound textbook in this field that covers psychological variables and also includes some conceptualization on the educational program and planning. Not well known, but better than average.

French, J. L. (Ed.) *Educating the gifted: a book of readings.* New York: Holt, Rinehart & Winston, 1964.

The second edition of the readings book is much expanded and improved over the first. It is characterized by careful selection and organization of the articles and gives an overview of all areas, with the exception of differential curriculum.

Gallagher, J. J. *Teaching the gifted child.* Boston: Allyn & Bacon, 1964.

A textbook written primarily for the teacher which places particular emphasis on stimulating methods of thinking and on the impact of the new curriculum movement upon program development for gifted students. Separate attention is also given to the underachiever and culturally disadvantaged talented youth. This represents one of the first texts to break away from the traditional and almost exclusive concern for administrative, rather than classroom, modifications.

Gallagher, J. J. (Ed.) *Teaching gifted students: a book of readings.* Boston: Allyn & Bacon, 1965.

A book of readings covering definition and identification, curriculum modifications, teaching method changes and special problems. It follows the outline of the book *Teaching the gifted child* (previous entry). Emphasis is on the variety of curriculum changes and pedagogical changes that can be implemented for gifted students.

Gardner, J. W. *Excellence.* New York: Harper, 1961.

An excellent and highly readable text that explores the values of the democratic society and the relationship between excellence and equality in education. This is a pertinent reference for anyone considering the value issues surrounding the establishment of special programs for the gifted.

Getzels, J. W. & Jackson, P. W. *Creativity and intelligence.* New York: John Wiley, 1962.

A report of a research study comparing students high in creativity tests with students high in IQ tests. Although it has many technical faults, it is important for its influence on the widening definition of giftedness.

Gowan, J. C. & Demos, G. D. *The education and guidance of the ablest.* Springfield, Ill.: Charles C. Thomas, 1964.

A large volume concentrating on administrative devices, and guidance and counseling procedures. Good for those interested in administrative procedures. Has extensive bibliography.

Gruver, H. P., Terrell, G. & Wertheimer, M. (Eds.) *Contemporary approaches to creative thinking.*

A collection of papers from symposium on creative thinking. Many interesting ideas and extraordinary conceptualizations make this a better than routine collection of papers. The chapter on computer thinking is especially provocative.

Heath, R. W. (Ed.) *New curricula.* New York: Harper Row, 1964.

The best single reference describing the many new curriculum projects and developments over the past decade. Separate chapters are presented describing each of the projects, and additional selections are presented on topics such as evaluation and implications for further development.

Hollingworth, Leta. *Children above 180 IQ.* New York: Harcourt, Brace & World, Inc., 1942.

A classic case study approach on children who are literally one in a million. It is distinguished by its rich insights and understanding.

Myers, R. E. & Torrance, E. P. *Invitation to thinking and doing.* Minneapolis, Minn.: Perceptive Publishing Co., 1961.

Especially designed for teachers, this manual is a rich source of ideas and examples on how to stimulate thinking along a number of different dimensions, particularly in the creative areas.

Plaut, R. L. *Blueprint for talent searching.* New York: National Scholarship Service and Fund for Negro Students, 1957.

This book documents the unfavorable situation of minority groups in this country, as far as higher education is concerned. It also presents a powerful case for a greater utilization of talent in this area for the benefit of the total culture.

Reynolds, M. (Ed.) *Early school admission for mentally advanced children.* Washington, D. C.: Council for Exceptional Children, 1962.

Six separate discussions of the issues and some research results evaluating early school admission for gifted children. It is possibly the most thorough summary of research and practice to date. Results seem to be generally favorable if a flexible plan for selection of students is utilized.

Schachtel, E. G. *Metamorphosis.* New York: Basic Books, Inc., 1959.

Here we have a discussion of the development of the creative person from a psychoanalytic framework—an interesting point of view not often considered in education.

Shertzer, B. (Ed.) *Working with superior students.* Chicago: Science Research Associates, 1960.

Readings covering most of the educational problems in this field. The emphasis is on guidance and secondary school programs.

Taylor, C. W. (Ed.) *Research conferences on the identification of creative scientific talents.* Salt Lake City: University of Utah, 1955, 1957, 1959.

These three reports represent papers given at three separate research conferences held at the University of Utah. Although by now some of the concepts, new and exciting then, have become commonplace, they still represent an interesting set of papers on the subject, particularly as related to the adult characteristics related to creativity and attempts to identify scientific competence.

Terman, L. M. *Genetic studies of genius I-V.* Stanford, Calif.: Stanford University Press, 1962-1959.

A five-volume set, the most extensive longitudinal study ever undertaken in American psychology. It follows a group of gifted students through middle age and later adulthood and remains the best source of characteristics of intellectually superior children and adults from advantaged circumstances.

Torrance, E. P. *Guiding creative talent.* Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1962.

A summary of Torrance's work in the field of assessment of creative abilities and his ideas on needed guidance procedures. Included is a useful discussion of the many problems faced by creative children in the educational setting and what should be done about them.

Torrance, E. P. *Rewarding creative behavior.* Englewood Cliffs, N. J.: Prentice-Hall, 1965.

The newest in a series of publications by this author describing various experiments and programs to stimulate the creative thinking abilities, mainly of elementary school students. Much of this material has not been published before, and much of it deals with direct educational intervention techniques for modifying the student's behavior and, as such, should be of particular interest to educators.

Torrance, E. P. & Myers, R. E. *Teaching gifted elementary pupils how to do research.* Minneapolis, Minn.: Perceptive Publishing Company, 1962.

This is an extensive discussion of specific procedures and methods of training students in adopting a scientific attitude toward the world. The authors give accounts of experiments that children carried out, and the book contains many ideas for teachers.

Ward, V. S. *Educating the gifted: an axiomatic approach.* Columbus, Ohio: C. E. Merrill, 1961.

Unique book attempt to describe the rationale for programs for the gifted, and to some extent, the type of program that should be given on the basis of rational and logical analysis. The approach to the problem is worth reading for its singularity, although there are not many specific suggestions to teachers.

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